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RAVE REVIEWS

cont.

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"Absolutely exceptional memory capable of lower latency timings at stock speeds and still pull through with a jaw dropping overclock to boot."

tweaknews.com

Aug. 31, 2005

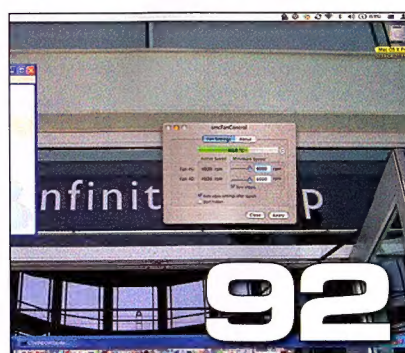
"In our tests, the PQI3200-1024DBUs turned out terrific performance along with impressive overclocking results....to top it off they're priced to sell!"

hothardware.com



THE ULTIMATE MEMORY FOR Hardcore GAMERS

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Your own, super-powered guide to getting the most from your PC experience. *Atomic's* greatest minds came together and out of it came 101 excellent tweaks, tips and hints.

Head to Head: Gaming headphones 38

Seamus Byrne loves headphones. Okay, this is an unverified claim, but considering 20+ went on his head during the last month or so, he must have some affinity for them. Oh, and he reviewed them for us while he was at it.

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What a gorgeous game! Truly! If you love Prince of Persia then you'll go crazy for this. Find out why *Assassin's Creed* is the next-gen title to watch out for, with the help of Logan Booker.

Mega blowhole mod 88

Luke 'Defyant' St Clair can't help but mod. It's in his blood and, as a result, in his garage. Watch this crazy man build a big blowhole in the front of his PC case using putty, saws and willpower.

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Jake Carroll continues on from last month's tutorial on Mac virtualisation. If you've always wanted complete control over your operating systems and resources, this is the guide for you.

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EDHEAD

Season beatings

As I write this, Craig is on the phone, organising the sexy, often luminescent hardware reviews for next issue. Bill, bless his little heart, is working furiously to lay out all the nice text we've provided him over the past two or so weeks. Our sub-editor, Richard, is slowly going over our jargon-filled ramblings and Ben is playing Snow Patrol's *Chasing Cars* at the loudest possible volume his puny multimedia system can supply. As for myself, well, I'm typing my editorial, as you've already guessed, you sneaky devil.

All this points to what we call the 'Christmas issue' or the 'holy crap we have two weeks to make a magazine issue'. While you'll read this through January/February, the beginnings of the issue were some time in mid-November 2006, in a similar environment to that described in the first paragraph.

Despite the super-overload mode required to get this issue done, it has in no way compromised the content or the quality within. Like you guys, we hold ourselves to a high standard, and if we don't reach it with ample quantities of highness left over, we do away with fingers as punishment using Craig's rusty Stanley knife that's for opening boxes and trimming his toenails.

A resounding 'ew' later and we can talk about what's in the issue.

First up is our cover feature - 101 ways to hack your PC. Inside this seven-page monster is a collection of tweaks, hints, tips and advice on making your PC faster, and easier to use, increasing your enjoyment of it. Craig and I sat for hours scrounging our brains for every tidbit of celestial knowledge and '101' as it came to be called is the result.



We also asked Ashton to take a look at the X-Fi and compare it to today's onboard sound chips. You might think this is the most unfair, bias matchup in the history of matchups (except when we pitted Bill against a bottle of whiskey... damn thing didn't stand a chance), but really, onboard has come a long way from the tinny crap you would always avoid, even if it meant flogging your dad's collection of die-cast model WW2 fighters on eBay to afford a Creative sound card. These days onboard chips support EAX 1 & 2, as well as 5.1 and 7.1 surround, and the comparison turned out to be interesting indeed.

Gaming and audio guru Seamus Byrne strapped 18 headphones to his head and gauged them on their gaming prowess. Along with your range of cheap gaming sets, Seamus bagged a few high-end models to see how well they performed outside the realms of simple music reproduction. If anything is going to push a headphone for clarity and quality, games will do it, as you will see in this issue's Head to Head.

Uber babe developer Jade Raymond over at Ubisoft Montreal also gave us a few hours of her time and answered a number of questions on Assassin's Creed. This awesome-looking stealthy platformer is shaping up to be one wicked title (can I still use wicked without being beaten on the street?) and if anything is going to scream 'next-gen' when the PS3 hits in Oz, it'll be Creed.

Finally, Luke 'Defiant' St Clair put together a great blowhole guide for the modding-inclined, Jake Carroll continues with his Mac virtualisation project, Kate Inabinet almost exploded and loads more.

Happy New Year and enjoy the holidays. We know Bill will.

Logan Booker
lbooker@atomicmpc.com.au

Atomic 71 winners: 10x Burning Crusade ZBoard Keysets plus ZBoard Keyboards Q: What is the name of the new Alliance race in The Burning Crusade A: Draenei. M. Willis, Koolwong NSW; D. DCruz, Mordialloc VIC; R. McKendrick, Lakes Entrance VIC; T. Paladin, Sunnybank QLD; B. Stevens, Mount Barker SA; P. Cunningham, Mount Druitt NSW; Y. Lee, Eight Mile Plains QLD; S. Harrison, Brisbane QLD; T. Bok, Adelaide SA; T. Gloster, Bundaberg QLD. 5x copies of Fear Extraction Point Q: What is the name of the little girl in FEAR? A: Alma. E. Carville, Deleah VIC; J. Kerr, Brassall QLD; S. Mitchell, Modbury North SA; K. Kleemann, Westcourt QLD; J. Lane, Sandfly TAS.

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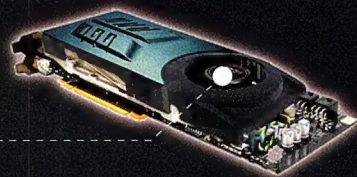
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“AMD expects to have transitioned its entire CPU range from 90nm to 65nm by mid-2007.”

speeds of 1066MHz, 1333MHz and 1600MHz). The plan is that AM3 CPUs should work in AM2+ and AM2 (with restricted features), AM2+ CPUs should work in AM3 sockets, but AM2 CPUs won't work in socket AM3 due to the enforced split voltage planes in AM3.

Whew.

Back to the roadmap! The CPU codenamed 'Agena' will arrive in the second half of '07 (quad core, 512KB L2 cache per core, 2MB shared L3 cache, 2.7-2.9GHz) and is the first expected AM2+ chip and will also be our first taste of AMD quad core (or as AMD has taken to calling it, 'true' quad core). There'll be an FX variant of Agena that will of course be multiplier unlocked, Socket 1207 and will work in the 4x4 platform.

This will be followed by 'Kuma' (2.0-2.9GHz, 512KB L2 cache per core, 2MB shared L3 cache), the dual core part, and then things start getting a little interesting. 'Rana' is also a dual core part, but is expected to take over the mid-level Athlon 64 single core parts. 'Spica' is the last entry on the roadmap. It is single core and sits neatly between the entry-level Sempron and the mainstream Athlon 64 brands.

So yes, AMD has a plan for the next year. Still, we don't think we'll see anything vastly competitive with Intel until 2008, and the Big 'I' has just announced that its 32nm process is looking good...

AMD fabricates the future

Craig Simms dips his toes into the puddle of AMD's roadmap.

AMD is about to catch up to Intel in the fabrication stakes and hit 65nm with a big wet slap, like Sylvester Stallone's face hitting the pavement. There's no new tech here though folks - it's just a die shrink.

Known as the 'Brisbane' core, AMD expects to have transitioned its entire CPU range from 90nm to 65nm by mid-2007. Brisbane is aimed at the AM2 socket, and four products have already been released: the 5000+ (2.6GHz), 4800+ (2.5GHz), 4400+ (2.3GHz) and 4000+ (2.1GHz), all with 512KB of L2 cache and a TDP of 65W.

In the single core 65nm arena this will be followed up by 'Lima', a 512KB cache AM2 part and 'Sparta', the budget 256/128KB version.

We then hit a socket change with AM2+. In

combination with the associated new CPUs this will bring in HyperTransport 3.0 (upgraded from the revision 1.0 currently being used) for a glut of bandwidth, split power planes for memory controller and CPU voltages, DDR2-1066 support and SSE4a instructions. While it is a socket change, there's fortunately a level of backwards compatibility between the sockets.

AM2 CPUs will work in AM2+ sockets (thanks to the socket supporting both unified and split power planes), but you won't have any of the advantages brought in by the new technology. Similarly sticking an AM2+ CPU into an AM2 socket will work, but you'll lose all said advantages, effectively dumbing it down to an AM2 equivalent. Then there's AM3, due in 2008, which should support DDR3 (in expected

SHORT CIRCUITS



CEO of Seagate, Bill Watkins, says that his company isn't doing anything special, reports CNNMoney. 'Let's

face it, we're not changing the world. We're building a product that helps people buy more crap - and watch porn.' Bravo Mr Watkins, bravo.

AMD's R600 GPU is due for February of

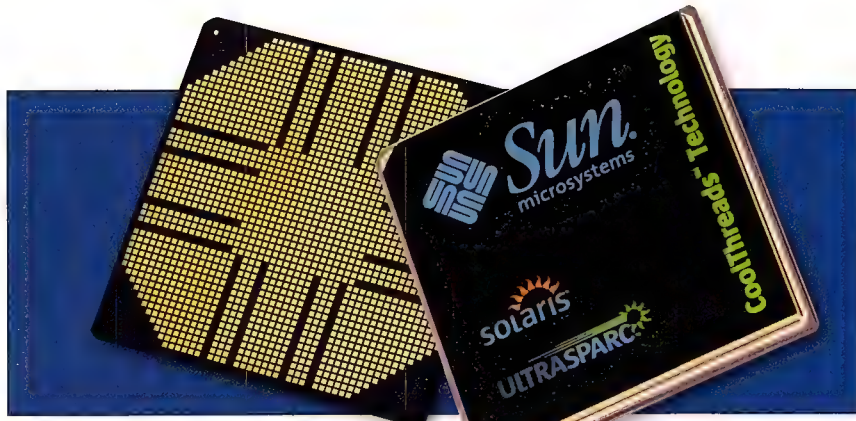
this year. Although there were GDDR3 and GDDR4 SKUs planned, rumour has it we'll now only see the GDDR4 parts from the company. NVIDIA is currently using GDDR3 - it'll be interesting to see when, not if, it decides to make the switch.

The Lightscribe SDK has been released for Linux, meaning with a bit of tinkery you can now burn images or labels onto the flipside of appropriate discs. Viva la penguin!

3DMARK®

Futuremark has updated 3DMark06, 3DMark05 and PCMark05 to take advantage of Vista and at the same time has taken the opportunity to squash a few bugs. If you want to be included in the online rankings from now on, you'll need to use these new versions.

The Internet Archive has managed to secure its exemption from the



Sun's Sweet 16

Sun Microsystems whacks 16 cores onto its upcoming server chip, writes Logan Booker.

While we're down here getting excited about quad core, because, well, there's four damn cores on the one chip, Sun Microsystems is steaming ahead with a 16-core design called 'Rock' that could see the light of day as soon as 2008. Aimed at the high-level server market, Rock will be manufactured on a 65nm process and incorporated into Sun's server products.

If Sun's existing eight-core monster, the UltraSPARC T1, is anything to go by, Rock will be able to handle 64 threads simultaneously and sport a 3-6MB 12-way set associative L2 cache. Sun claims 79W peak energy consumption on

UltraSPARC T1, so something in the area of 120W-160W should be expected for Rock, thanks to the smaller manufacturing process. Again, based on the T1, the cores should be clocked around 1.2GHz, which accounts for the low power usage, compared to the speedy (and hot) 2.5GHz+ ratings on dual and quad Core 2s and Athlon 64 X2s.

With Intel and AMD catching up on the multi-core front, and Cell already throwing about eight cores in the PS3, Sun will really need to get behind Rock if it wants to stay in the high performance server game.

Creative axes EAX

If you don't have an X-Fi, say bye to EAX in Vista, writes Logan Booker.

Windows Vista's focus on stability and security was going to cost us gamers in the short term, and the rotten fruits of this decision are just starting to drop into our laps with the release of the Vista RTM. Awful out-of-the-box OpenGL support was first, and now the new driver model has banished EAX support for owners of Live! and Audigy series Creative sound cards. Creative has addressed the issue for X-Fi boffins by releasing EAX drivers for Vista for this card, but for everyone else its tough bananas. There's a workaround available using Windows XP drivers – but it's not for the faint

of heart. If you're determined to wield EAX in Vista, and don't have an X-Fi, check out this post: forums.creative.com/creativelabs/board/message?board.id=Vista&message.id=427.

Microsoft has removed MIDI and game port support from Vista, so driver install errors related to the Creative game port are Microsoft's fault, not Creative's. Vista does include an 'Unsupported Creative game port' driver that you can install to bugger off the error message.



United State's ridiculous DMCA so it may continue holding and providing access to copyrighted works for the sake of history. The move ensures no one at the IA will be sent to the federal-pound-me-in-the-arse-prison.

NVIDIA and AMD have been pulled into court over a possible conspiracy over the prices of video cards. No doubt the outcome is quite a long way away, but still, there could well be cheap

GTX and XTXs on the horizon.

It didn't take too long – a cracked version of Microsoft's Key Management Server (KMS) has made it out into the wild, allowing activation of volume licensed copies of Vista Business and Enterprise without ever needing to talk to Microsoft. Of course this means you won't be able to contact Windows Update or access WGA in any way if you live on the naughty side of the fence.

FUTUREPROOF

Gazing into the crystal ball of tech

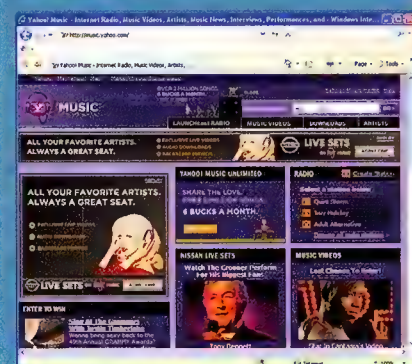
DRM-be-gone

Dare we get hopeful? A few big labels have started releasing DRM-free MP3s in an experiment to see how the market reacts.

EMI has released Norah Jones' *Thinking About You* and Reilient K's *Must Have Done Something Right*, while Sony BMG has ousted Jessica Simpson's *A Public Affair*, and Walt Disney, ever hopeful, threw out Jesse McCartney's entire album.

All of this has happened through Yahoo Music – seemingly pushing for an interoperable format, thus opening to a much larger audience. About time too, considering MP3s were around long before the DAP revolution was a twinkle in Jonathan Ive's eye.

Whether or not it'll draw the public's interest will depend on if the masses unwashed even understands the difference between DRM and non-DRM tracks – we just hope there's plenty of advertising to go along with it to educate, or our bright happy DRM-free future will be squashed quicker than a numbat under an 18-wheeler.



POST OF THE MONTH

With so many golden posts this month, and each of them a gem, it is with great cheer in our hearts that Amiga4eva has finally taken home the trophy!

His noteworthy contributions this month:

You'd think a guy like me would have written a post like this before now...

www.atomicmpc.com.au/forums.asp?s=1&c=1&t=98059

Lemony Snicket's A Series of Choking Events
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=98095

The French Vs The World, with mods in between
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=98205

And the golden post that gets the prize:

Be careful what you wish for...

www.atomicmpc.com.au/forums.asp?s=1&c=1&t=98242

We all love the pink girly Atomic and the Mod's locked Atomic, both hilariously funny, the detail was phenomenal and we appreciate they would have taken a while to whack up.

Amiga's famous around the forums for his creative genius, and his wise, philosophical posts. So thanks.

Every Post of the Month wins a fabulous Logitech mouse from the brilliant people at Logitech... Huzzah!!!!



SCANNER

Game, indie and online news enthusiasts

SCANNER

Night Elves in powered armour by 2010? Yes please!



Fallout MMO in 2010?

Interplay's back and trying to make moolah, Logan Booker writes.

A recent Securities and Exchange Commission report filed by Interplay shows the company is making an effort to bring a Fallout-based massively multiplayer online game into the market.

Currently all Interplay has is a prospectus pitching the Fallout MMO for a private placement – like a public offering, except the equities are only

available to select investors – and the success of the Fallout franchise. We can only hope this will be enough to tempt funds Interplay's way.

Interplay however has a lot riding against it – for example, the company's poor track record when it comes to money. Despite releasing many successful titles, including Baldur's Gate, Icewind

Dale, Planescape: Torment and of course, Fallout, Interplay still found a way to go bankrupt and to this day, still owes former employees and the US Government.

In an attempt to dig itself out of the hole it had so deftly made, Interplay put the Fallout franchise up for sale – with the exclusion of MMO rights. Bethesda finally picked Fallout up in July 2004 after supposedly beating out the now-defunct Troika and the Feargus Urquhart-run Obsidian Entertainment. Even with the rights to the MMO, it seemed doubtful at this point that Interplay would find the resources to make the game a reality.

According to a November 20 filing, Interplay has come a fair way since those dark days.

'Having significantly reduced our debt over the past two years, we are now in an improved position to raise capital. This private placement will be another critical step toward the funding and development of our Fallout property into a massively multiplayer online game, which represents our plan for growth in the coming years,' said Interplay CEO Herve Caen in the filing.

Ten days later, Interplay provided the SEC with a prospectus for the MMO. According to the presentation, Interplay plans to start production of the game as soon as January 2007, with a launch date of July 2010. All up, the company is looking for \$95m to complete the project, with \$38m for the production budget.

So where will this money come from? The sale of discounted Interplay shares to private investors (non US-based, which is a smart move considering Interplay's track record) through a 'French investment bank'. The sale is set to wrap up on December 31, so by the time you read this, we should know if production will start in January, as Interplay hopes.

As for Fallout 3, Bethesda has yet to release any new information on the title and we can only guess that it is still in the pre-production or early production stage. According to PR manager Peter Hines, the game will likely use the Gamebryo engine of Oblivion fame. With the massive Oblivion out of the way, it's highly probable that an announcement on F3 will be made in 2007.

“Despite releasing many successful titles, including Fallout, Interplay still found a way to go bankrupt.”

SHORT CIRCUITS

Remember the Counter-Strike price market we talked about a few issues back? Looks like its developed a few problems, namely driving the cost of both the TMP and Mac 10 to a bargain \$500, while making the ever-popular Desert Eagle a whopping \$1000! In response, Valve plans to tweak the power of the other pistols to



make them more appealing and hopefully, bring some balance to the DE.

The ultimate strategy game of all time, Dominions 3, has received a patch, bringing the title to 3.04. Along with a new nation and a new map, 3.04 fixes the annoying Hunter of Heroes bug that had powerful characters being wasted for no reason at all. Grab the patch here: www.shrapnelgames.com/lllwinter/Dom3/6.htm

Feel like you could be doing something more productive than playing online games all day? How about playing them for money? SkillGround is an online gaming service that allows you to enter tournaments for four different games and, if you win, you'll make a few bucks. For more info, see www.skillground.com

According to online reports, various PlayStation3 games will feature region-based censoring – in effect, removing



Wii-remote their-remote?

Nintendo rustles up patent trouble with it's fangled new console, writes Logan Booker.

Clara Solomon believed war was the mother of invention. This may have been true during the Civil War and even World War 2 but today, invention is the mother of war. Legal war that is.

A US company called Interlink Electronics is claiming that Nintendo has violated a patent it filed back in 1997 for a 'Trigger operated electronic device' – or patent #6,850,221 if you plan on digging it up. Anyone can see from

looking at the diagrams that accompany the patent that the device has more than a passing resemblance to the Wii-remote. It also doesn't take a genius to know that Interlink could have jumped on this any time before the very recent and successful launch of the Wii console. If anything, the company's delayed reaction just goes to show that patent suits are no longer about protecting IP, but cashing in on it.

Sony's history goes portable

Craig Simms wants to play Tekken 2 on his PSP.

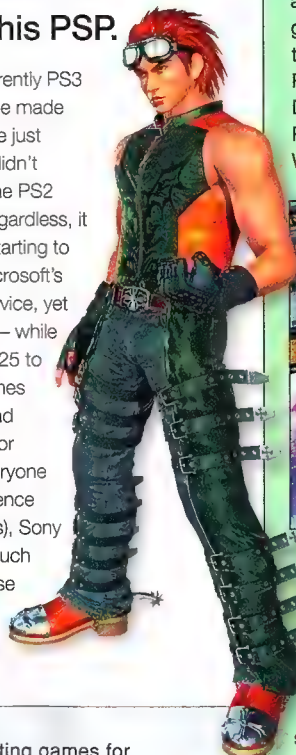
Sony has released four original PlayStation games for PSP for download through its PlayStation Store service. The store can only be accessed if you own a spanky, shiny new PlayStation3. Despite being a logistical difficulty in this country at the moment, yay!

Mind you, you can't actually play the games on the PS3, they're for the PSP. Boo!

So to play PSP games, you need a PS3 to download them in the first place. Genius. That's reward for some pretty insane brand loyalty – you'd be downloading an original PlayStation game probably based on your nostalgia of playing it on your original PlayStation, to download on your PlayStation3 on which it's not playable, to transfer to your PlayStation Portable through USB to memory stick. And paying US\$5.99 for the privilege. It's because you love Sony that Sony loves your wallet... we mean you.

The titles currently available are Coolboarders, Crash Bandicoot, Hot Shots Golf 2, Syphon Filter and Tekken 2, and range from 280 to

500MB in size. Apparently PS3 playable games will be made available soon – we're just surprised that Sony didn't somehow squeeze the PS2 into the equation. Regardless, it shows that Sony is starting to play hardball with Microsoft's Xbox Live Arcade service, yet with a different focus – while Microsoft imposes a 25 to 50MB limit on its games (citing slow broadband speeds as a reason for enforcing this, so everyone gets a decent experience and low waiting times), Sony appears to have no such limits. Despite the false start, it looks like the gloves are finally coming off.



gore, swearing and other unsuitable content depending on whether you live in the US or Japan. As you can imagine, the claim has caused a bit of an uproar in the gaming community. By the looks of things though, Australians will be free to enjoy all the gore they want.

Microsoft has let loose the final version of XNA Game Studio Express and it is now available for download: www.msdn.com/XNA. XNA provides a development

environment for creating games for PC and Xbox 360, but you'll need a Creator's Club membership (about US\$99) if you're really serious about developing something.



PIPELINE Hot games to watch out for



War Front: Turning Point

Release date February 2007

While we're waiting for Red Alert 3, Digital Reality has decided to make its own semi-historical sci-fi RTS. Set in an alternate reality in which Hitler was assassinated early in the Second World War, War Front allows you to jump into the role of the Soviets, Germans or Americans and play out a global conflict that never happened. Mixing it up are some high tech elements, like stealth bombers and exoskeletons, and along with a research tree to nab these goodies, you'll be able to use a quasi-FPS mode to really get in on the action.

Platform PC

Developer: Digital Reality

Publisher: 10tacle Studios

Web: www.war-front.de/en



Galactic Command: Rise of the Insurgents

Release date Q1 2007

According to the mighty Derek Smart PhD, Galactic Command won't be your 'run-of-the-mill' space combat simulator. It'll have intrigue, space, and intrigue. Oh, and a plot about the Terran Military of Smart's universe tangling it up with the rebellious insurgents. You play the captain of a fighter wing on a GALCOM battle cruiser, and it's up to you and your band of scallywags to toast those mofos. Sounds like Wing Commander all over again, but we're willing to give Derek the benefit of the doubt on this one, as it's technically not another Battlecruiser game.

Platform PC

Developer 3000AD

Publisher 3000AD

Web www.3000ad.com

ATOMICCHAT

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A rare shot of Tim, out in the wild. Well, at IDF Taipei.

Gigabyte's high-end motherboard portfolio.

Tim Handley

Logan Booker talks with Gigabyte's regional marketing manager for Asia and Africa – a man who is so close to super PC technology, he is that technology. But human.

Tim Handley's been at the beating heart of high tech PC components – otherwise known as Taiwan – for close to seven years. *Atomic* had to get closer to this otherwise normal-looking bloke.

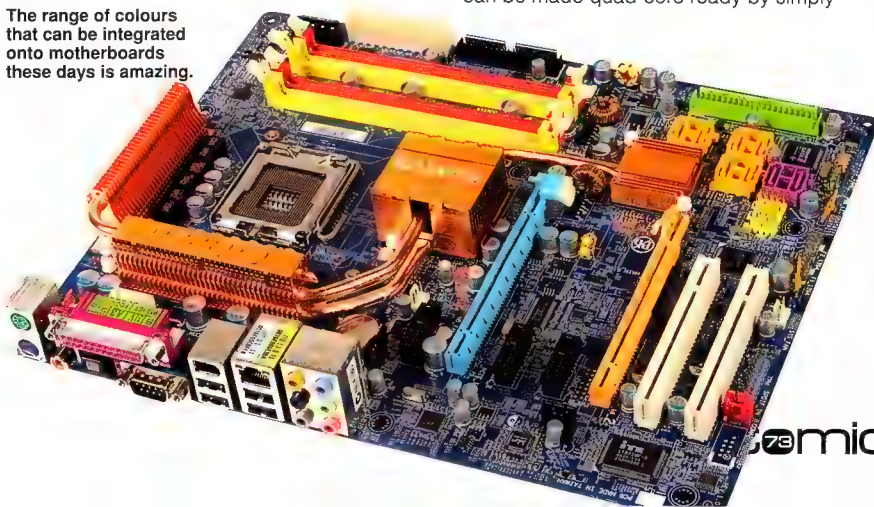
atomic What would you say is currently big news in the component industry? Is there anything that everyone is watching?

Tim Handley I would say that the biggest news at the moment is Intel's new Core 2 Quad CPUs. They are compatible (after a BIOS update) with most existing 965 chipset motherboards and promise a substantial performance boost for power users. For NVIDIA chipset fans there's the new range of highly overclockable 500 series chipset-based motherboards for Intel Core 2 Duo and Core 2 Quad CPUs, and on the graphics side the NVIDIA's 8800 graphics processors are set to impress and will be featured on a myriad of VGA cards over the next two quarters.

atomic What can you tell us about NVIDIA's latest chipsets?

Tim Handley The 500 series has brought SLI capability to the Intel Core 2 Duo and Core 2 Quad platforms, and this is really where the demand for SLI is expected to grow significantly in the near future because of the success that the Core 2 Duo CPU is enjoying in the enthusiast PC market. From all accounts 590 looks like a great product with ample headroom for overclocking and loads of useful features. It will add a little more spice to

The range of colours that can be integrated onto motherboards these days is amazing.

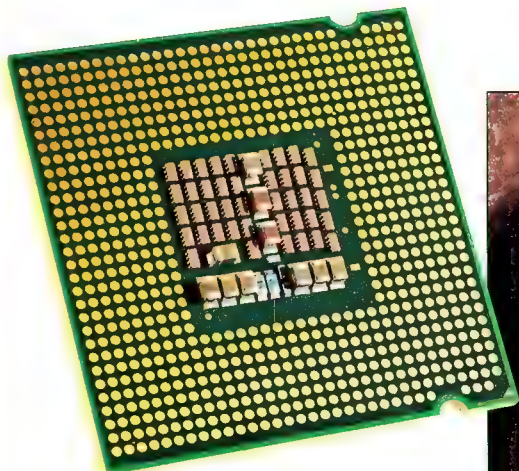


atomic Is it true the Intel's current quad-core implementation isn't really 'quad-core'? Can you explain why this is so?

Tim Handley This is an interesting question because there is a lot of speculation regarding how Intel and AMD's quad-core architectures differ. In my opinion if it has four cores inside a single package then it qualifies as a quad-core CPU regardless of how many dies there are! What makes the Intel Core 2 Quad processor newsworthy now is that it boasts up to 70 percent better performance than the Core 2 Duo (and that's no small feat), it is compatible with existing 965 chipset motherboards that use the latest BIOS, and most importantly the Core 2 Quad is available now. Naturally, later quad core architectures from both Intel and AMD are expected to offer further architectural advantages and performance improvements otherwise it would be pointless to bring them to market. For now though, I reckon that the Core 2 Quad is the highest performance desktop processor on the market.

atomic Is it also true that while some motherboards may be 'quad-core ready', they're not 'quad-core optimised'? What is the difference between these two classifications?

Tim Handley Most 965 chipset motherboards can be made quad-core ready by simply



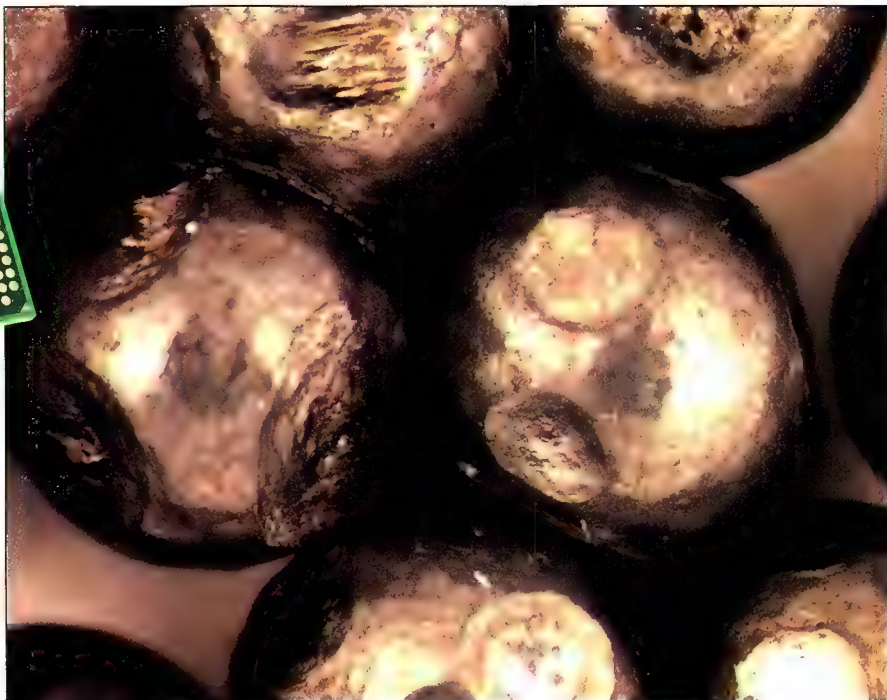
▲ Core 2 proved to be Intel's sucker punch to AMD. 2007/2008 will hopefully see AMD back on its feet.

updating the BIOS. However, the fact remains that these boards will be running a 130W Core 2 Quad CPU on a platform that was designed for a 65W Core 2 Duo CPU. Now the latest 965 chipset motherboards from Gigabyte (V2.0) introduce some features that are optimised for power hungry quad core processors, such as six-phase power for the whole range of motherboards, reinforced trace routing around the CPU, all solid capacitors across the board and more capacitors around the audio chips to reduce electrical noise and improve the audio experience – actually this has nothing to do with quad core optimisation, it is a prerequisite for Windows Vista Premium certification. But this feature is on the new quad core ready boards from Gigabyte. By widening the FSB trace routing we reduce the FSB impedance from 50 ohms to 42 ohms so that there is less resistance for the electrical signal to travel between the CPU and the FSB. This increases the speed at which the signal travels and improves signal quality.

atomic How have recent events in the industry (the ATI/AMD merger for example) affected Gigabyte?

Tim Handley AMD's acquisition of ATI is expected to have a profound affect on the motherboard industry because AMD did not only get excellent graphics technologies with its purchase – it also got a full range of platform technologies such as northbridge, southbridge, networking, audio, SATA (storage), etc, not to mention cool stuff like TV tuner (remember the All-in-Wonder?) and mobile technologies. Up until now the effect that this has had on the motherboard and VGA card industry is very limited, but we're looking forward to some radically innovative new products towards the end of 2007 from a new PC platform giant.

atomic AMD has confirmed that we will be seeing CPUs and GPUs on the same die. Where do you draw the line between integrating something on a CPU die or on the motherboard PCB? How will AMD's decision

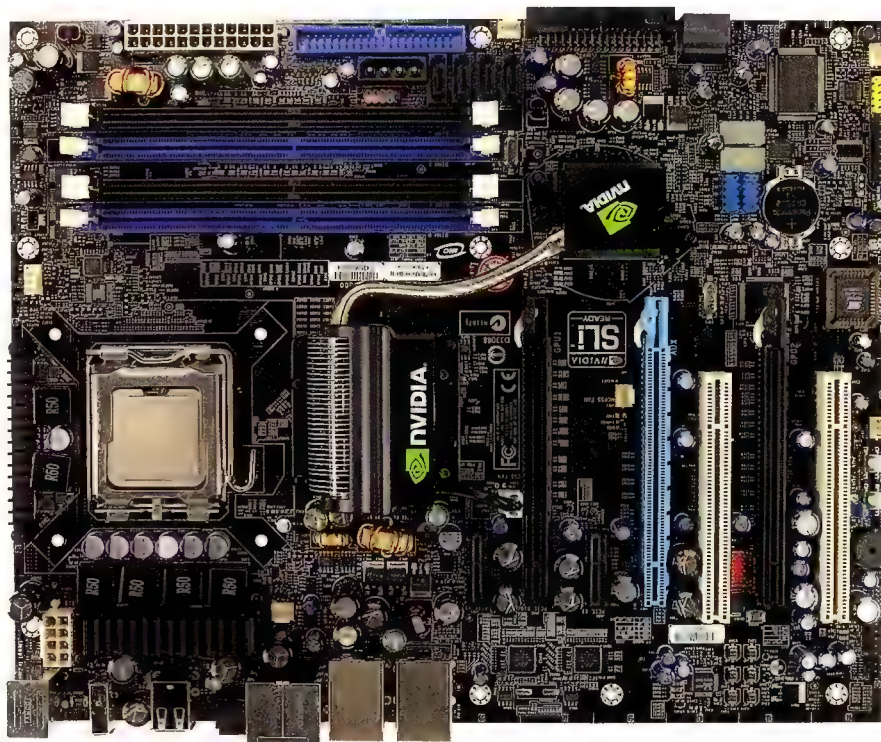


▲ The aim of the Reduction of Hazardous Substances (RoHS) initiative is to remove nasty metals, like lead, from electronic components.

affect Gigabyte?

Tim Handley The line is drawn, I would say, when your primary design goal is high performance as opposed to some other attribute such as ultra low power (fanless operation), compact system design or affordability. The little-known AMD Geode processor is a prime example because it incorporates an x86 CPU, graphics,

northbridge and southbridge functionality onto a single die – this is actually a National Semiconductor architecture that AMD bought from it a while ago. The Geode processor can apparently run Windows operating systems, but you wouldn't use it for PC gaming. Even if future high-end CPUs include DX10 capability on their dies, I think it is questionable that they will outperform a discreet CPU and VGA card



▲ NVIDIA's chipsets have shown themselves to be excellent, time and time again.

setup where the VGA cards uses high speed DDR3 or DDR4 memory and a 16 lane PCI-E bus. Regardless of AMD or any other CPU vendor's future designs, Gigabyte will be at the forefront of new PC gaming technologies and we'll be making motherboards for CPUs with or without integrated graphics.

atomic How has RoHS (Reduction of Hazardous Substances) affected Gigabyte's business and the industry in general? Is it a big thing with manufacturers like Gigabyte?

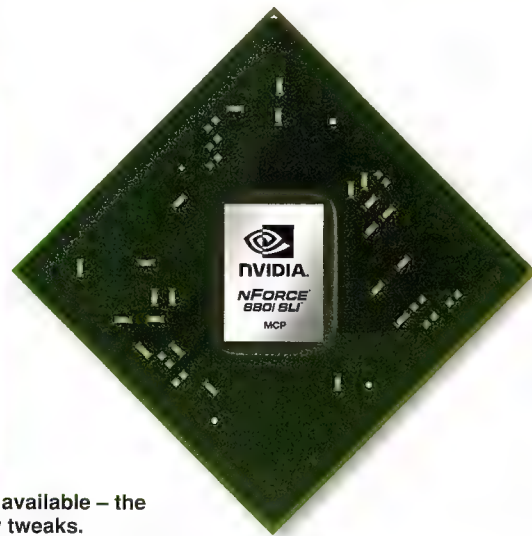
Tim Handley RoHS has affected everyone in the PC industry, including Gigabyte, because it is an essential move if you want to sell electronics products internationally today. There is a significant cost associated with RoHS compliance in that we had to substitute the solder that we have traditionally used to secure components onto motherboards and VGA cards with a substrate of silver (Ag), copper (Cu) and tin (Sn). However, Gigabyte is committed to doing its bit for the environment and so it has built this cost into its business strategy together with its decision to use other top quality components such as solid capacitors from Japan and Dolby-certified audio that helps it to make industry leading products. Naturally, the cost per motherboard for RoHS compliance is reduced somewhat because we have introduced this feature on all of our motherboard and VGA card products.

atomic Integration seems to be the way things are going these days, if we are to believe what AMD/ATI is saying. What do you think we'll see integrated on motherboards in the future?

Tim Handley Arguably the most exciting prospect would be to have a discreet graphics chip and VGA memory on the motherboard, but this is not likely to affect the PC gaming and enthusiast segment seeing as most people who are interested in decent graphics would want to upgrade their graphics at some stage. This kind of solution would however be very suitable to media centre motherboards



▲ Already NVIDIA has 590's successor available – the 680i. It's the same product with a few tweaks.



“ Arguably the most exciting prospect would be to have a discreet graphics chip and VGA memory on the motherboard, but this is not likely to affect the PC gaming and enthusiast segment. ”

that need to be low profile but pack enough of a punch to play PC games. I think that motherboards targeting media centre systems could very well integrate graphics, memory and even a TV tuner in the future.

Another exciting prospect is that of integrating some sort of solid-state non-volatile memory onto the motherboard (remember Gigabyte i-RAM?) – the idea being that data situated in solid-state memory can be accessed quicker than on a mechanical hard drive that has to spin up before data can be retrieved. There are a number of ways that this can be implemented: the SATA interface used by Gigabyte i-RAM and hybrid hard drives

with added non-volatile memory, Microsoft is using USB 2.0 in Vista with its ReadyBoost technology and in 2007 there will likely be new technologies that use PCI Express interface to connect to some sort of solid-state non-volatile memory – a useful application for all those unused PCI-E x1 slots on high-end motherboards! All of these applications can be integrated directly onto the motherboard with relatively little effort from motherboard vendors if there is sufficient demand for them.

atomic Finally, do you think there will be any dramatic changes to motherboard construction in the next five to 10 years? Perhaps making them more accessible, cheaper to produce or safeguarding against damage (such as the relatively recent switching of pins onto the motherboard socket with Intel CPUs).

Tim Handley Well I hope that the printer port will soon disappear from the IO bracket leaving space for more useful connectors or ventilation. However, I don't think that there will be any really dramatic changes to motherboards designed for the PC gaming and enthusiast markets in the next year or two. There will of course be smaller changes like high definition video connectors for VGA cards and motherboards with integrated graphics, Gigabyte's use of solid capacitors or reinforced trace routing for quad core processors.



▲ Integrated heatsinks on motherboards? Oh, wait...



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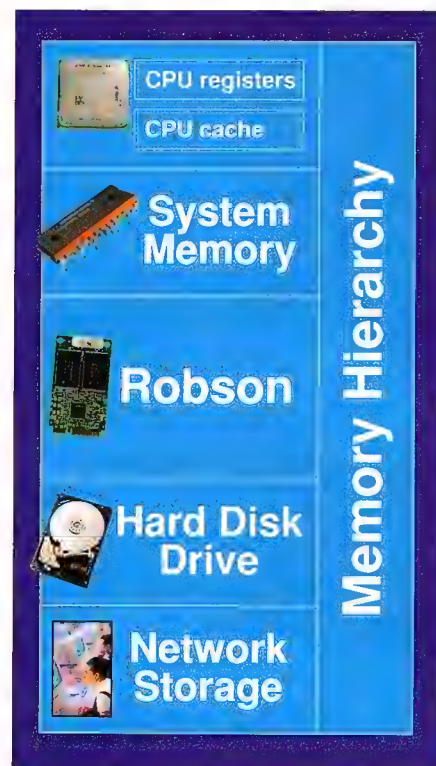
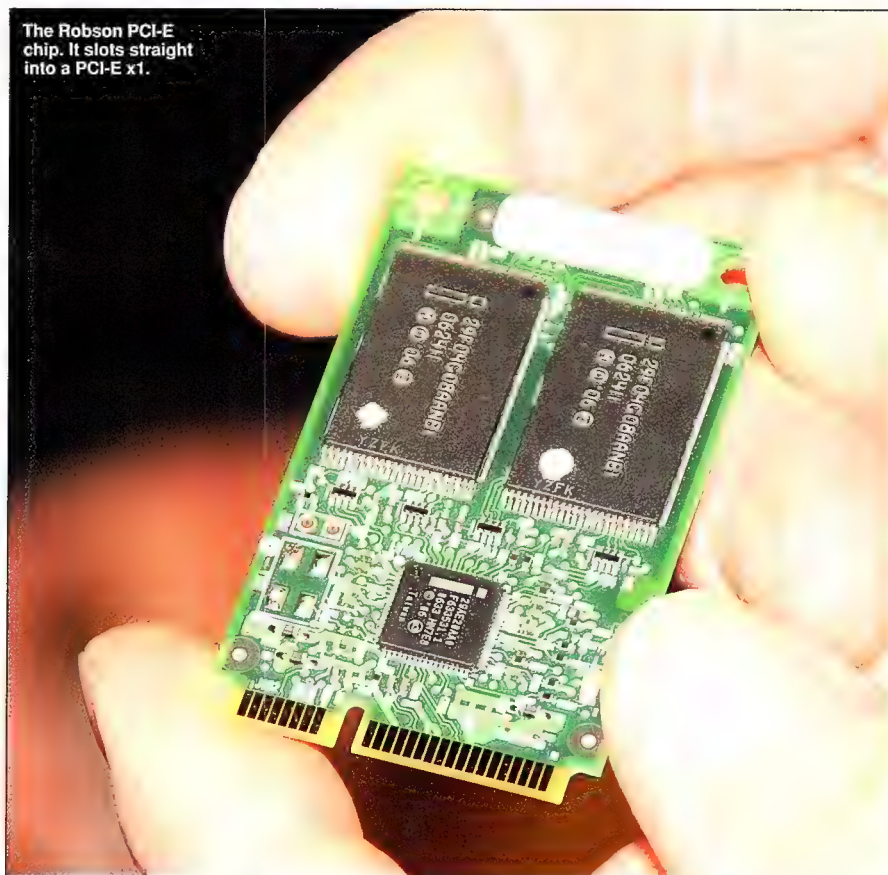
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ATOMICX-RAY

Looking at
tech from
the inside

X-RAY

The Robson PCI-E chip. It slots straight into a PCI-E x1.



▲ Robson slides in nicely between main RAM and the hard drive, caching read and write requests for faster access by the system. *Source: Intel*

Intel's flashy flash

Logan Booker takes a look at Intel's 'Robson' flash technology and how it'll speed up hard drives, super-fast.

Have hard drives really gone anywhere in the past decade?

The answer to that question is yes. And one of those big yeses you would say to an offer of chocolate or a flying automobile.

Capacities have increased in leaps and bounds, with an extra helping of leaps and our interpretation of 'big' has changed from megabytes to gigabytes – soon to be terabytes in the space of three to six months. Once, 320GB on one drive was a dream. Now it's standard, and quickly increasing, for most HDD purchases.

Drive interfaces have also changed, with the old parallel interface being replaced by serial, or SATA. Not only does SATA provide more bandwidth for our data needs, it also has plenty of headroom and expandability. Four drives on a slave/master configuration is a thing of the past, and it's not at all unusual for people to run multiple drives in RAID.

But, while we've seen a great deal of improvement in the hard drive space in terms of capacity and bandwidth, few to no steps have been taken to improve speed. Hard drives are little faster at grabbing data than they were back

in 1995. Even with higher rpm, the only way to get better performance from your drives is to put them in RAID 0 or, more intelligently, 1+0. Without the speed, that extra bandwidth from SATA goes to waste.

Birth of the hybrid

Enter Samsung and Microsoft – Samsung with the hardware and Microsoft the software. While there's little chance hard drives will be replaced soon by something quick like flash – they serve their primary function as cheap non-volatile storage devices far too well – there was nothing stopping these two companies from coming up with a compromise. A hybrid. The initial plan was to stick up to 1GB of volatile flash RAM onto a hard drive, and use it to cache HDD reads and writes, softening the mechanical latency inherent in all hard drives. Microsoft even made Vista ready for this new type of drive, implementing software support via its ReadyDrive tech and requiring, as part of Vista Premium certification that all PCs have hybrid drives.

Except Vista's here and the drives aren't.

But wait!

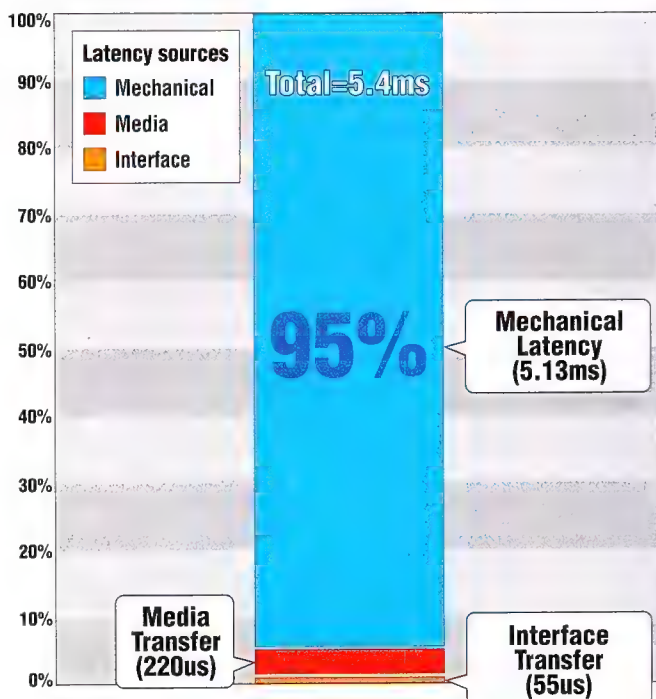
Obviously Microsoft couldn't leave an unachievable certification floating in the air so the decision was made to delay the hybrid hard drive requirement for Vista Premium certification until 2008. Microsoft has its own fallback tech, called ReadyBoost, that makes use of the flash RAM available on a removable thumb drive to increase drive performance.

Intel, however, has also come up with its own hardware solution that makes use of flash RAM, independent of the HDD.

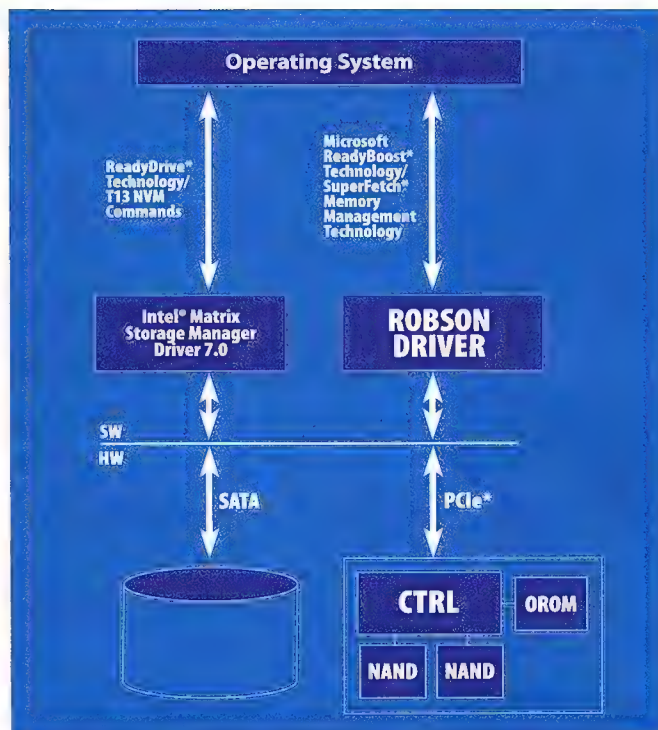
Called 'Robson', the technology can be incorporated directly onto motherboards or via a module plugged into the PCI Express bus. The technology is a combination of NAND flash RAM and a software driver, that acts as a cache between system drives and main RAM. NAND flash provides read and write speed benefits over traditional NOR flash, along with higher densities, longer rewrite life and low price, and is perfectly suited for the job as intermediate cache.

For Intel, Robson provides two benefits for the company going forward – increased performance and, as a direct side effect, energy efficiency. By caching data from the hard drive to flash, data is read faster, the drive does not seek as long and allows the system to go into idle mode sooner. According to tests by Intel presented earlier this

Average latency on a 16KB read operation



▲ There's not much speed to be squeezed from the interface and bus – all the performance is lost when the drive itself goes to grab the data. *Source: Intel*



▲ Intel has developed a special Vista driver for Robson, independent of Microsoft's ReadyBoost and ReadyDrive. It is however compatible with both. *Source: Intel*

“While media speeds have improved, it has been a gradual climb and hard drives have been neglected.”

year at the company's developer forum in Taipei, for mobile platforms Robson provides on average two times the performance and 400mW of power savings over those without Robson. The presentation also mentioned that Robson will be a part of Intel's new mobile platform, Santa Rosa.

Intel's research into hard drive transfers concluded that the read time for an average workload is 5.4ms, and that the system often waits for the hard drive to provide data. The breakdown of that 5.4ms revealed that combined, data transfer from the drive and over the system bus accounted for just over 300 microseconds, while retrieval of data from the disk, or mechanical latency was a massive 5.13ms. Intel defined mechanical latency as the time spent for the read heads to find the data on the drive, known as the 'seek' latency, and the time it takes to spin the drive platters to position the data under the head, known as 'rotational' latency. In addition, Intel found that less than 25 percent of drive reads are sequential and often, the drive will have to perform a complete rotation to locate data as the platters are unable to spin 'backwards'. This backward spin can take anywhere up to 20ms to perform.

Intel also found that, while media speeds have improved over the years, it has been

a gradual climb and that compared to hard drive capacities and CPU speeds, hard drives have been neglected.

Robson is the first technology to change this. Using intelligent algorithms that, according to Intel's group manager for mobile platform architecture Guy Therien, have cost Intel

a substantial amount of time, effort and money, Robson is able to most of the time correctly cache data from the hard drive, saving the system the trouble of retrieving it and eliminating mechanical latency. The algorithms also work to increase the life span of the NAND flash by spreading the workload evenly across the 1GB capacity of the flash on Robson.

Intel says that Robson is compatible with Windows Vista's ReadyBoost and ReadyDrive technologies, via the Robson system driver.

Intel's future plans for Robson include free partitioning of the flash for personal usage and the consolidation of flash chips, such as a motherboard's BIOS, into Robson.



Until hybrid drives arrive, Robson is the best option.

Z-ACCESS

The big picture behind technology and the world around us

The violence was already in us but GTA has given us a taste for nicking cars.



Games don't kill, people do

Do violent games fill us with a desire for blood? Tim Dean says the desire's already there.

Violence never solved anything. That's what I was taught as a kid. But now I'm not so sure it's true.

There's no question there are preferred ways of solving conflicts, but there are times when violence is necessary, and singularly effective. In fact, in certain circumstances violence can be the quickest and most effective way of imposing your will on another. For better or for worse, this appears to be a simple fact.

Consider a prehistoric tribe of early humans, living a roaming hunter-gatherer lifestyle. Life is harsh, resources are scarce, and competition with nearby tribes is fierce. If the tribe leads an entirely pacifist lifestyle, it is an easy target for its neighbours. The neighbouring tribe can walk unperturbed into the camp and steal any food, tools or women it wants. This can have devastating consequences for the tribe – possibly threatening its survival altogether.

However, should the neighbouring tribe acknowledge the threat of force in retribution should it attempt such an act then it might be less inclined to steal from the tribe. This threat of violence would make the potential cost of stealing from the tribe greater than the value of the stolen goods.

This threat of violent retribution also can't be hollow. There needs to be the will and capability to follow through, and this needs to be clearly demonstrated. This would lead to the strongest individuals needing to spend some time and effort arming and training for war. It's also likely it would make its war practices a part of the culture by adding a ceremonial aspect. This would serve to enhance its threatening image, which in turn would act as an increased deterrent to its neighbours.

Even with this threat, there'll surely be times when one tribe considers the risk to be worthwhile, and violence ensues. In this case things could end in disaster for both tribes. However, without the threat and capacity for violence, the first tribe would have ended in disaster anyway.

Consider also that humanity evolved over hundreds of thousands of years during the Pleistocene period in just such hunter-gather societies. And when

I say 'evolved', I don't just mean in body. We evolved in mind as well.

It's reasonable to believe the behaviours and cognitive mechanisms that aided survival in that environment were subject to the laws of natural selection in the same way as physical characteristics were. This would imply that violence, as well as concepts such as revenge and retribution, were selected during this period, making them a part of human nature – a nature that remains virtually unchanged to this day.

Does this mean humans are hopelessly predisposed towards violence in a society where such a predisposition causes far more harm than good? Perhaps.

But if our propensity for violence evolved, then it's also reasonable to assume the counterpoints to violence evolved as well. Violence works well as a last resort, but a culture of ever-escalating violence eventually hurts everyone and benefits few. As such, we evolved other behaviours and cognitive mechanisms, such as empathy, fairness and justice. Thus the very human nature that tends towards conflict and violence is the same human nature that built the great institutions of justice, human rights and peace.

In this context we can shed some light on the ever-popular issue of violence in computer gaming. According to the latest research, it appears as

though games don't encourage violent behaviour as much as they reflect our inherent propensity for violence. That's not to say there might not be some cases where violent games can tip an individual over, but what it is saying is we are clearly *not* born as a blank slate onto which violent media scrawls a fatalistic message.

There's still much we don't know about our violent nature, but this lesson we can take home; games don't kill, people do.

Send Tim and email... but be polite, or he may just track you down and beat you up.
tim@atomicmpc.com.au



“ We are not born as a blank slate onto which violent media scrawls a fatalistic message. ”

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THE LAST SOUND BLASTER?

Are outboard sound cards really better than onboard? What exactly are the differences, and do they justify the money? Do cats always land on their feet? Ashton Mills investigates all but the last one.

You'd be surprised at how often this comes up in forums the globe over (well, not in the 'camel fetish' forums, more just the technical ones) – 'Should I buy an X-Fi?' Although Creative's X-Fi isn't the only outboard solution, it's arguably the best. But it doesn't mean the answer to that question is always a yes, because like almost everything in life, it's frequently a matter of (in this case, aural) perception.

If we look at it in terms of sound quality then yes, Creative's X-Fi is better. That's why you pay the big bucks for it. But the question is, *how* much better, and under what circumstances would onboard sound suffice?

(Sound) Blast from the past

Believe it or not, but the history of PC sound is as brutal as any FEAR or Call of Duty level. And it's this history that's driven the industry to where it is today.

Much like kids these days would probably scoff at the idea of a black and white TV, so too there was a time when PCs were actually *silent*. And no, not because the volume knob was turned down, but because these poor prehistoric ancestors of our beast machines today were physically incapable of producing sound. We know, crazy!

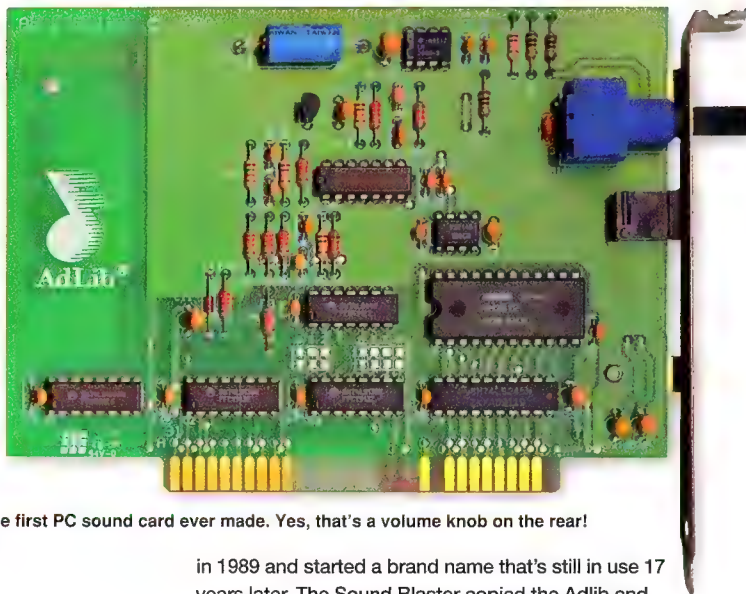
And while in 1981 IBM added the 'PC speaker' to its chassis, and a PC could beep – but not a lot else – the revolution in sound didn't start until the end of the decade. A revolution to which even something as abstract and modern as the iPod owes its heritage.

In 1987 a company called Adlib released the world's first sound card. Sporting a Yamaha YM3812 (aka the OPL2) chipset bound to an ISA card, and some off the shelf parts, the Adlib could play up to nine simultaneous (and rather synthetic) sounds in mono. It was the first programmable card to allow synthesised sound on the PC, and it was beautiful. Ostensibly it was designed for music production and not games, but its potential for the latter was quickly realised – and the reason why, you'll remember, sound cards generally came with joystick ports even up until just a few years ago.

At about the same time a Singapore-based company called Creative Technology – to become Creative Labs in the US – saw the potential too, and released the 'Game Blaster' sound card in 1998. While stereo compared to the Adlib mono, the Philips SAA 1099 chip it sported was horribly basic, and couldn't match the Adlib for synthesis.

Nevertheless, within five years, Adlib as a product and company would be dissolved.

Creative's next card, the Sound Blaster, was released



The first PC sound card ever made. Yes, that's a volume knob on the rear!

in 1989 and started a brand name that's still in use 17 years later. The Sound Blaster copied the Adlib and ditched the Philips SAA 1099 in favour for Yamaha YM3812 the Adlib used, which also made it compatible for titles based on the Adlib, and sported a joystick port. It quickly became the de-facto sound card to have, and created the market for the subsequent Sound Blaster Pro (introducing the Yamaha OPL3), Sound Blaster 16 (bringing 16-bit quality), Sound Blaster AWE32 (32 simultaneous voices). Others were sold too, ultimately putting Adlib out of business.

Adlib wasn't the only company to fall in the shadow of the growing Creative behemoth. Gravis, formerly known for its joysticks, entered the market in 1992 with the Gravis Ultrasound. Years ahead of its time it introduced 16-bit sampling, 32 simultaneous voices two years before Creative, and wavetable synthesis – as opposed to Creative's FM Synthesis – which allowed real instead of simulated sounds to be played. This put Creative's offerings at the time to shame. Stylised by its red PCBs, the GUS saw various iterations including the Ultrasound Max, Ultrasound PnP, and Ultrasound Extreme. The GUS was the first sound card to bundle onboard RAM, and in fact some models could be expanded to 8MB (later 16MB, thanks to modders) onboard to provide room for high fidelity sound patchsets.

The first GUS cards were based on the GF1, a chip jointly developed by Gravis and Forte Technologies. Later, AMD would get involved and the GUS would sport the 'AMD InterWave' chipset in the GFA1. A bit of trivia: According to Wikipedia, the drivers for the InterWave were written by a company called eTek Labs, containing members of the original Forte Technologies team that worked on the GF1, and which in August 1999 was

acquired by Belkin and remain part of Belkin's R&D team.

Despite its advances, the GUS was killed by a lack of good Sound Blaster compatibility. Using entirely different chipsets, Gravis had to emulate Sound Blaster support in software – with the famous SBOS, Sound Blaster OS – but it rarely worked and was finicky at best. Despite the fact GUS was the superior technology, Creative's established user base meant games at the time were made for the Sound Blaster, and without such support the GUS was rendered useless. Still, it garnered the passion of the demo scene – such as the popular Future Crew – and some of the biggest names in gaming history, including Doom/Doom II, Duke Nukem 3D and Star Control II. These titles had native support for the GUS and really showed off its potential.

It just wasn't enough, and eventually the Ultrasound division of Gravis closed its doors.

This left Creative with free range on the market, until Aureal started to gain popularity with its A3D technology, which created impressive 3D audio positioning with just two speakers. This allowed gamers to hear the directional source of a sound in games for the first time. Lets be clear here: A3D was *awesome*. Aureal's Vortex2 chipset propelled manufacturers like Diamond into the limelight with its Monster Sound MX300, until in 1998, feeling the heat, Creative sued Aureal for patent infringement. Aureal defended itself and won, but the cost of the legal battle was so high the company filed for bankruptcy.

And so, in 2000, Creative bought the remnants of the company, claiming Aureal's technology to be its own. In fact, the impressive virtual 3D sound for headphones on the X-Fi is based on this technology.

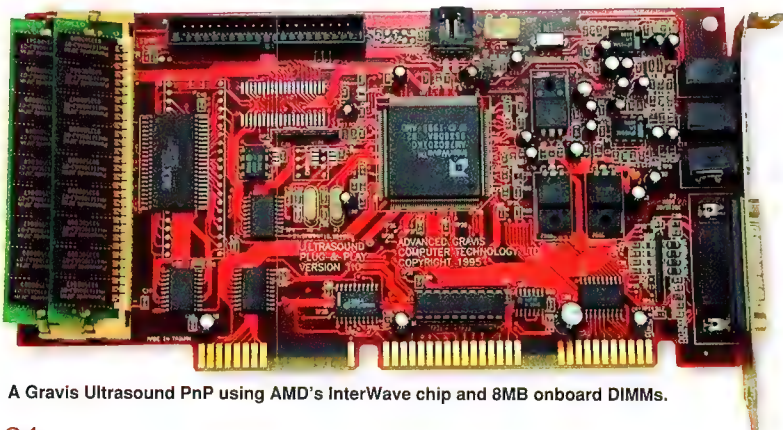
Now, after fending off waves of competitors, Creative is yet again under threat – but this time not by outboard manufacturers, but onboard. Realtek, initially a network chipset company, has been providing onboard audio codecs for years. Early versions were, to be fair, absolute crap but in the last few years onboard sound has come so far as to cause forumers to ask the question 'Do I buy an X-Fi?'

Well, here's our take on it.

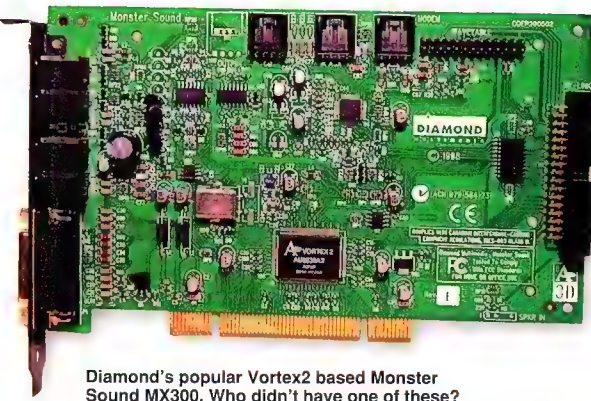
IT'S ALL ABOUT FEATURES

Creative's claim to fame has always been impeccable audio quality. This is what set the Audigy apart when it was first released, and you could actually hear the difference in quality over the previous Sound Blaster cards.

The X-Fi, arguably the best outboard solution available today, pushes this further but the advance of onboard sound has come so far to muddy (or shall we say clarify) the waters when it comes to sound quality. Many sound good enough to make it hard to tell them apart without good speakers.



A Gravis Ultrasound PnP using AMD's InterWave chip and 8MB onboard DIMMs.



Diamond's popular Vortex2 based Monster Sound MX300. Who didn't have one of these?

This is an important shift, because not only is onboard sound effectively 'free' – the cost is so cheap that it's negligible to a user buying the board – but it's also enabling everything from home PCs to office PCs to be quite capable of producing quality sound. Which is an ideal scenario for a Windows Vista world where PCs both look and sound good.

But it also means Creative has competition again. The X-Fi comes with a lot more than just good audio quality, since its launch Creative has been forced to differentiate the card with features such as the CMMS-3D, X-RAM, EAX 5.0 and the Crystallizer. Some are more useful than others, but if you're going to fork out a few hundred for a sound card these days, it really has to offer something more than just audio quality.

So what value do you put on these? Audio quality, although subjective, can at least be quantified and that's exactly what we'll get onto in a moment. Feature wise, it depends on what you want to use your sound for – music, games, music creation and so on. In all cases the X-Fi will win here, but considering onboard sound is so cheap – practically free when you buy your motherboard – it's the value you put on the features more than sound quality that is usually your best guide.

On that note, here's what we think separates the outboard and onboard competition (see table). For our comparison in this piece we're using Creative's X-Fi in Fatal1ty formation and one of the most popular onboard Realtek codecs in circulation today – the ALC850.

The X-Fi also offers, obviously, a greater software bundle especially for audio creators. But the primary use for most is music and games. For music, quality output is paramount of course, but for games it is feature support that's important. If you want to take advantage of recent EAX versions in games, there's no alternative. Similarly the 3D positional audio for headphones is indeed brilliant, but you don't exactly need it – much like the Crystallizer. And as for the famed X-RAM,

GENERAL SPECS

	X-Fi Fatality	ALC850
Output	7.1 channel	7.1 channel
Playback	24-bit 192kHz	16-bit 48kHz
Recording	24-bit 96Khz	16-bit 48kHz
Voices	127 voices	25 voices
Features	ASIO, X-RAM, EAX 1-5, CMMS-3D, Crystalizer	EAX 1 and 2, A3D, HRTF 3D Positional Audio
Avg price	\$399	Free(ish)

we've heard neither good nor bad reports about it in games.

In fact, you probably wouldn't even notice if it was used or not – mostly because for it to be used it needs the OpenAL interface. It can't be used through DirectSound.

So even though audio quality is something to consider, it's not the whole picture. Here's our list of key considerations:

Audio quality

As in our initial X-Fi review (*Issue 57, page 34*) the X-Fi does have superb output, which we'll again benchmark here in comparison to the ALC850 (see below). However, to really appreciate it you need good speakers or headphones. If you have a pair of crappy old tinny speakers, you won't be able to hear the difference and onboard will do you fine.

Games

Features such as 3D positional audio and EAX support are the big wins for the X-Fi and one the main reasons to get one. Games are increasingly using the more recent EAX modes, and they usually pay off. And for 3D surround sound with headphones, the X-Fi's positional audio is superb. While the onboard solutions like the ALC850 do support 3D ►

It's the value you put on the features more than sound quality that is usually your best guide.



Everyone's ear is as different as their toe jam but we can still quantify real world results.

positional audio for playback, it's not usually supported specifically by games. Also note, there's currently no planned EAX support for Sound Blaster cards other than the X-Fi.

CPU load

Granted, the onboard solutions generally are more demanding because they're essentially codecs, not dedicated sound processors, and this can have an impact if your CPU is running to the hilt. But not all games push the CPU to extremes, and the CPU load, even with onboard sound, is only a few percent, as we'll see in a moment. So, it's worth considering but not as a primary reason to buy an outboard card.

Voices

In the flashback history above you'll note the ever increasing number of simultaneous sounds that can be played, otherwise known as voices or buffers. There's a reason for this. Inevitably, environmental sounds and the action going on in a game all require a unique channel for each sound played. The more voices, the more sounds that can be played at once. The Sound Blaster AWE32 had 32 voices, the Audigy had 63, and now the X-Fi has 127. Onboard sound, by and large, doesn't stack on a lot and our ALC850 maxes out at 25, which may or may not have an impact in games. But if it does, it can be problematic (see the boxout 'The benefits of buffers').

Driver support

For whatever reason, Creative likes to shoot itself in the foot when it comes to drivers. For the X-Fi, there's been a single update to the Windows drivers in a year, fixing some bugs but leaving others. At the time of writing, there are beta drivers for Vista but not final, despite Vista's recent RTM. And under Linux there is no support at all. By contrast, Realtek's drivers for the ALC850 have been regularly updated and is fully supported under both Windows and Linux.

Price

Well, not much to say here. Free(ish) tastes better, so onboard is the winner here.

HOW WE TESTED

While everyone's ear is as different as their toe jam, we can still establish a base line comparison by quantifying real world results. In other words, by playing some sounds and measuring the quality at which they are reproduced between the onboard and outboard solution. Additionally, features such as EAX and 3D positional sound all take a toll, so we'll test also for the CPU load of each solution at various levels of simultaneous voices in playback. The testbed machine is an Athlon FX-60 at 2.6GHz with 2GB

RAM on an ASUS A8N-SLI Premium. The latest Creative X-Fi and Realtek ALC850 drivers were installed.

Audio quality

To enable a fair comparison both solutions need to be recorded by the same source. In this case, the X-Fi is the better option, enabling us to sample at up to 24-bit 96kHz compared to the ALC850's 16-bit 48kHz – which is, to be fair, plenty for the majority of recording tasks.

For testing the X-Fi, a loopback cable is connected from the primary out to the line in, and for the ALC850 from its primary out to the X-Fi's line in.

To measure the quality of the audio output RightMark 5.5 is used to generate and analyse the incoming signal for frequency response, noise level, dynamic range, total harmonic distortion and crosstalk. Once set up, testing is quite simple.

CPU load

Again RightMark comes to the party with RightMark 3D 2.3, designed specifically to test CPU load using 2D, 3D and 3D + EAX audio for a variety of simultaneous playback voices ('Buffers' in RightMark). This is an important test, because each voice takes processing time, so the more simultaneous sounds in playback in a game, the greater the load on the sound solution (again, see boxout 'The benefits of buffers').

As we've already covered, one of the significant differences between the onboard and outboard solution is the number of voices they can play, so we'll be able to see just what impact using more voices has.

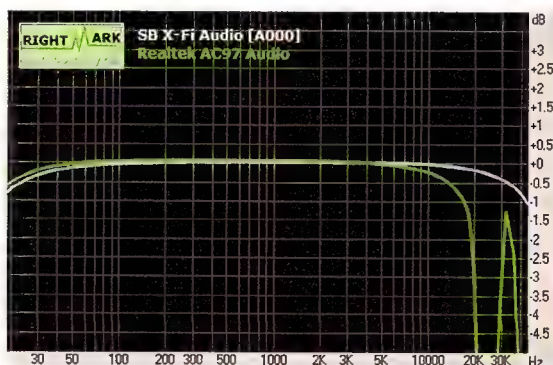
Just out of interest, we also tested the X-Fi with and without its X-RAM enabled, with interesting results.

RESULTS

The X-Fi is configured into Audio Creation mode and snazzy features such as the Crystallizer, CMMS-3D and EAX are disabled for the audio quality test to measure its ability to produce a clean sound. However, these features are enabled and the X-Fi put into Game Mode for the CPU load test, as these are precisely the settings people are likely to use for gaming. Additionally, going through DirectSound with RightMark 3D, the X-Fi's X-RAM is disabled, but out of interest we did a separate test for that too.

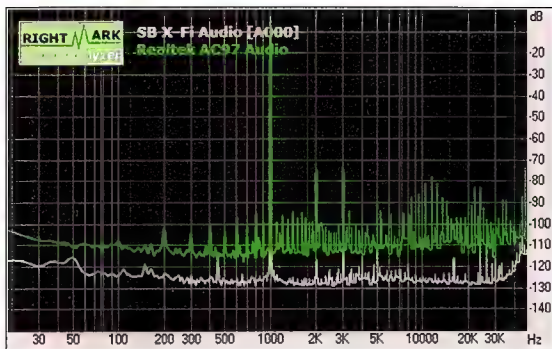
Volume levels were adjusted for peak performance to RightMark's level adjustment recommendations for best results. It's important to note here that the ALC850, even on maximum volume, couldn't quite provide the ideal volume level RightMark was asking for (to within -1dB), though it was still enough for a good measurement.

Keeping in mind the ALC850 maxes out at 25 buffers, the

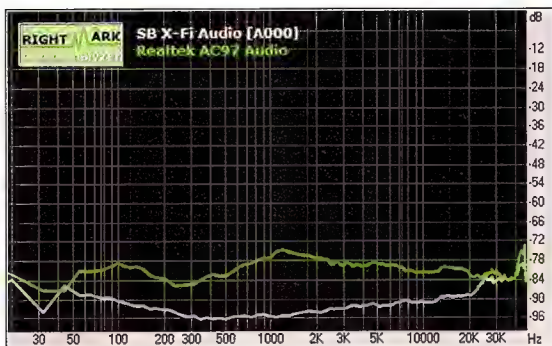


▲ Frequency response, notice the ALC850 cuts off strictly past 20kHz.

Audio quality Record source: 24-bit 96kHz		
	SB X-Fi Audio	Realtek AC97 Audio
Frequency response (from 40 Hz to 15 kHz), dB	+0.02, -0.19	+0.08, -0.65
Noise level, dBA	-96.5	-82.0
Dynamic range, dBA	96.4	82.4
THD, %	0.0018	0.040
IMD + Noise, %	0.011	0.663
Stereo crosstalk, dB	-96.1	-77.0



▲ Total harmonic distortion, with the ALC850 not quite as smooth as the X-Fi.



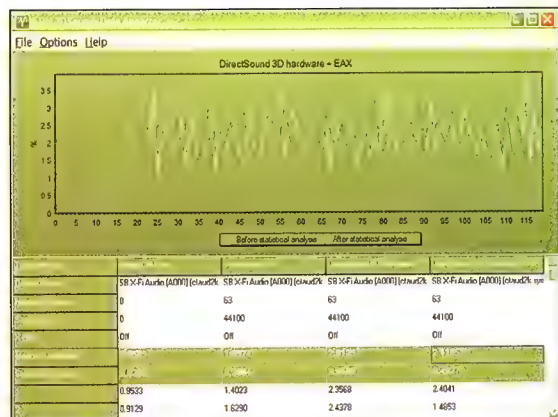
▲ Stereo crosstalk, a good result for the X-Fi but a little noisier on the ALC850.

63 buffer tests showed it merely cut off everything above 25 to score the results above.

What can we see? Firstly that under all tests the X-Fi is, indeed, easier on the CPU. Secondly, for both solutions, as the DirectSound mode increases and the simultaneous playback buffers increase, so does the CPU load.

But what about that X-RAM test? Using the OpenAL mode to enable and disable the X-RAM, and 63 buffers to give it a bit of a load we see the following.

The first result to notice here is that OpenAL is more efficient than DirectSound for the 63 buffer test when you compare them with the previous results, although the load seems to decrease as we move up the scale. And, of course, we can also see that using the X-RAM actually causes quite a hit. It's not clear in RightMark 3D how the X-RAM is used when enabled, so it's possible in a real world scenario that the use of it, even with a hit, may be better than no use at all.



▲ RightMark 3D in action measuring CPU load over time.

CPU load, percent average

	X-Fi Fatal1ty	ALC850	X-Fi Fatal1ty	ALC850
Buffers	16	16	63	63
Empty	0.95	0.95	0.95	0.94
DirectSound 2D	1.79	3.31	1.59	4.28
DirectSound 3D	1.81	3.90	2.01	4.64
DirectSound 3D + EAX	1.83	4.39	2.11	5.12

X-Fi Fatality CPU load, 63 buffers, percent average

X-RAM	Enabled	Disabled
Empty	0.95	1.62
OpenAL 2D	1.78	2.30
OpenAL 3D	1.60	2.33
OpenAL 3D + EAX	1.53	2.34

SOUND SUBJECTIVITY

It's no surprise the X-Fi Fatal1ty has the better audio quality, and a feature set to win the heart of gamers, but that's also why it costs real money. While the onboard ALC850 in our tests can't really compete on these fronts, it comes awfully close on audio quality. In fact, more recent motherboards may already come with the ALC850's successors, in variations from the ALC852 to ALC888. These are the 'HD' releases from Realtek, and sport up to 24-bit 192kHz playback, just as with the X-Fi. They don't however build on the gaming features, but if all you want to do is listen to music, you'd be better off spending the cost of an X-Fi buying music to listen to and use these onboard chipsets.

If, however, games are your priority and/or you shed dollars like dandruff, then undoubtedly an X-Fi is the way to go. Just make sure you pair it up with quality speakers or headphones, otherwise a large chunk of your investment is going to waste. If money is tight, onboard can still do a reasonable job with games – as long as they're not too demanding.

And, for what they do, onboard solutions come at a price you can't argue with.

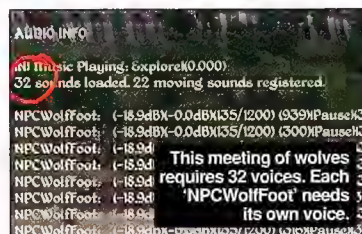
The benefits of buffers

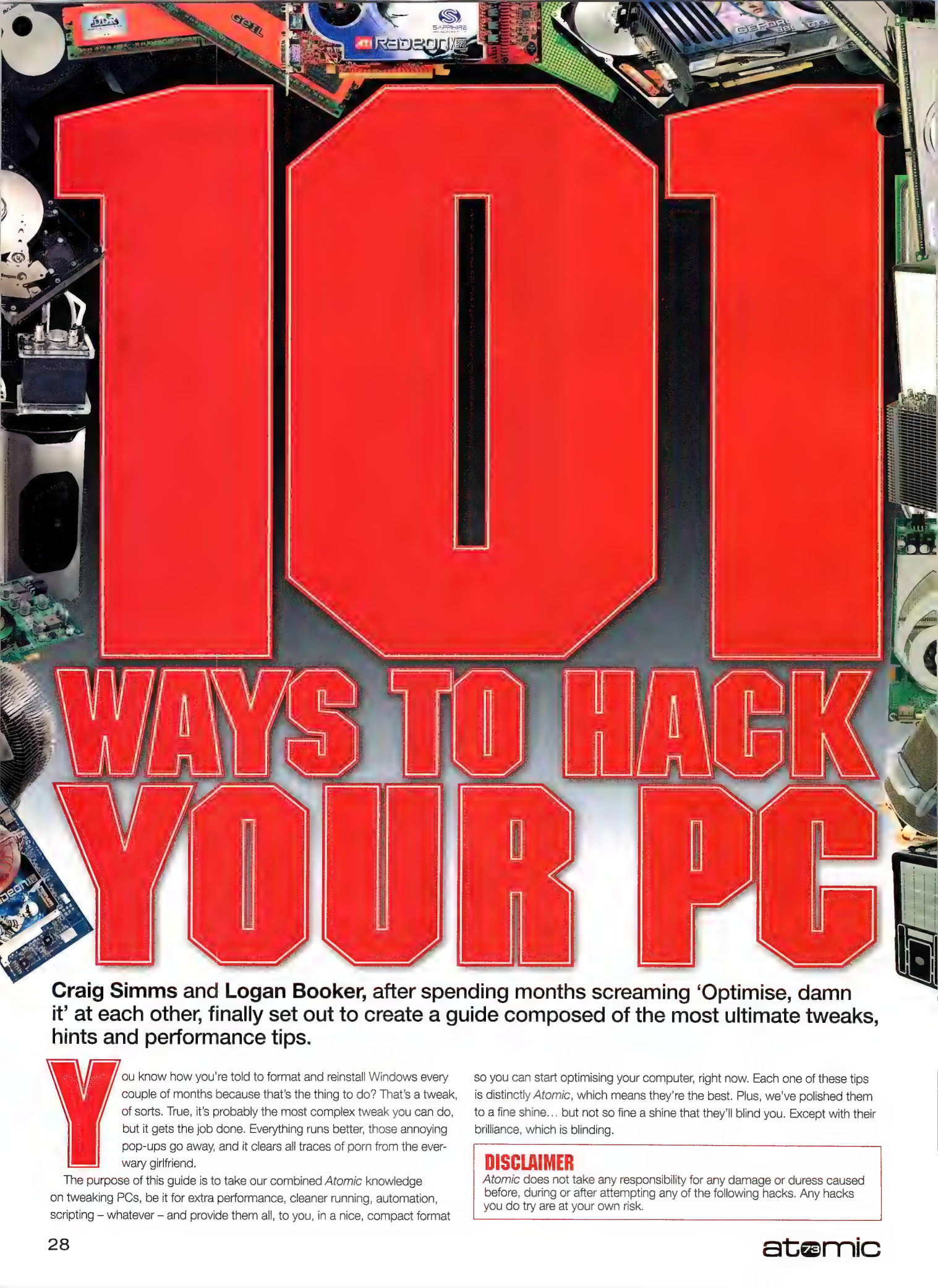
Just what impact the number of buffers, or voices, a sound card has depends on what you're playing. Music, of course, is no issue but games are. To create that rich tapestry of immersive sound requires many simultaneous playback voices. If the number of voices required exceeds the capabilities of the card, they'll either be truncated or queued, causing stuttering.

One of the most obvious examples of this is Oblivion, for which a common report on the Oblivion forums is stuttering when many actors come on screen, especially creatures.

For whatever reason, Bethesda assigned a footstep sound for each foot of a four-legged creature, so something as simple as four wolves adds 16 voices to the playback queue. When combined with ambient sounds, player sounds, music and combat effects, the number of voices can quickly jump to 30 or more, something most onboard solutions can't handle (the ALC850 we tested maxes out at 25 voices), and so stuttering occurs.

The problem is so rife that there's even a community made-mod to solve it, 'Quiet Feet', which literally zeros the WAV files for animal footsteps so they're processed instantly, and don't occupy a voice at all. And it works, solving the stuttering.





101

WAYS TO HACK YOUR PC

Craig Simms and Logan Booker, after spending months screaming ‘Optimise, damn it’ at each other, finally set out to create a guide composed of the most ultimate tweaks, hints and performance tips.

You know how you’re told to format and reinstall Windows every couple of months because that’s the thing to do? That’s a tweak, of sorts. True, it’s probably the most complex tweak you can do, but it gets the job done. Everything runs better, those annoying pop-ups go away, and it clears all traces of porn from the ever-wary girlfriend.

The purpose of this guide is to take our combined *Atomic* knowledge on tweaking PCs, be it for extra performance, cleaner running, automation, scripting – whatever – and provide them all, to you, in a nice, compact format

so you can start optimising your computer, right now. Each one of these tips is distinctly *Atomic*, which means they’re the best. Plus, we’ve polished them to a fine shine... but not so fine a shine that they’ll blind you. Except with their brilliance, which is blinding.

DISCLAIMER

Atomic does not take any responsibility for any damage or duress caused before, during or after attempting any of the following hacks. Any hacks you do try are at your own risk.

TORTUROUS TESTING

Making sure your system is stable, happy, and set up properly.

- 1** Check your burnt optical discs. Dye fades, discs become unreliable, you may have even had a bad burn. Once a year it's a good idea to run Nero CD-DVD Speed's (www.cdspeed2000.com) Scandisc, or even better DVDInfoPro's (www.dvdinfo.pro.com) CRC error test to make sure the entire disc is still accessible.
- 2** If you've found a dud disc, rather than recreate/redownload everything, it's preferable to recover as much as possible. Head to www.kvipu.com/ **CDCheck**, grab the program and your free licence key after you register. You could also try filererecovery.hostyourself.net/#JFileRecovery if online tools float your boat or if you're the money paying type, try www.isobuster.com.
- 3** Test your memory to make sure it's okay. Grab the bootable ISO of Memtest86 from www.memtest86.com and burn it, then restart the PC, boot off CD and let it do its thing. You can also use Microsoft's tool – for WinXP download it here: oca.microsoft.com/en/winddiag.asp. For Windows Vista, just type 'memory' into the search panel, execute the Memory Diagnostic Tool and you'll be given the option to restart and test. If you're running classic, you'll find it in Control Panel -> Administrative Tools.
- 4** If you're having trouble running your RAM in dual channel at the advertised timings but the sticks work individually, grab CPU-Z from www.cpuid.com, go to the SPD tab and make sure your sticks have the same programmed timings, or there aren't duplicate frequency tables. If there's a problem here, this could be the source of your issue.
- 5** While you're in CPU-Z, make sure your CPU is running at the correct frequency and has the proper multiplier and bus speed (the CPU tab will tell you).
- 6** Make sure all your cores are enabled, by pressing Ctrl+Shift+Esc, then going to the performance tab. Make sure that 'One Graph Per CPU' is checked under View -> CPU History. If this is the case, there should be a CPU usage graph for each of your cores. If not, then either ACPI/APIC is not enabled in your BIOS, or the wrong HAL for Windows has been installed. Firstly you'll need to check that these are enabled in your BIOS – assuming that this won't start blue-screening your Windows install, there are now two options.
 1. The most likely to work – reinstall Windows.
 2. The way that requires a bit of hacking around, and may result in a blue screen (perhaps create a System Restore point before you begin, or more extremely a drive image): Go to Start -> Settings -> Control Panel -> System, click the hardware tab and then the Device Manager button, expand Computer, right click on the device below it (likely 'ACPI Uniprocessor PC' or 'Standard PC') and choose Properties. Click Update Driver and say 'No, not this time' to the Internet prompt, click Next and then select 'Install from a list or specific location (Advanced)' and click Next. Select 'Don't search, I will choose the driver to install', click Next and select 'ACPI Multiprocessor PC'. Click Next and pray that it works.
- 7** Check the S.M.A.R.T. status of your hard drives with HDTune (www.hdtune.com) by selecting the appropriate drive and clicking the Health tab. You

may wish to run the Error Scan from here as well.

- 8** Defrag to squeeze out a bit more speed. Right click on your drive in Explorer, choose Properties, hit the Tools tab and then click 'Defragment Now'. Alternatively you could use a free trial of Raxco's PerfectDisk (www.raxco.com) to make the process a bit quicker.
- 9** Grab HDTach and make sure your hard drives are hitting the speed they should: www.simplissoftware.com. If your hard drive is SATA 3Gb/s capable, make sure it's jumpered properly to take advantage of this – you may be running at SATA 1.5GB/s without realising. A good indication of this is if your burst speed is about or below 180MB/s.
- 10** Look for problems. Grab SiSoft Sandra from www.sisoftware.co.uk, run all the benchmarks and make sure your components are performing as they should. Compare to review results online if need be.
- 11** If you have two onboard network ports, despite both being gigabit one may be going through the PCI bus instead of PCI-E. Sandra's Buses and Devices application should spill the beans, if you cycle through the adaptors and devices. If this is the case, you want the cable accessing your LAN to be hooked up to the PCI-E port so you lower the potential risk of the PCI bus getting saturated.
- 12** Download ATITool from www.techpowerup.com/atitool. It supports NVIDIA cards too. If your card isn't supported, check the beta forum to see if there's been an update. Run ATITool, and click Scan for Artifacts. If your card is running stably, no artifacts should be detected within the first minute. You can also take advantage of ATITool's direct overclocking here and Scan for Artifacts to check your new frequency is hunky dory, without the annoyance of NVIDIA's 'test' button for example. ATITool does not currently work in Vista.
- 13** If you have an NVIDIA GPU/motherboard, download nTune from nvidia.com and run the stability test from the NVIDIA control panel.
- 14** Grab Stress Prime 2004 (Orthos Beta) from sp2004.fre3.com. If you manage to pass Test 1, things are reasonably stable. If not, it usually crashes the system or gives you a fail before the first test is complete. This is a good tool to check that your CPU/memory overclocks are stable, and should help you find the optimum frequencies reasonably quickly.
- 15** No need to hold the nozzle right next to the components, dust is light enough that it can be sucked up at a distance. If you're scared capacitors will be ripped off, you'll need to disassemble your PC and dust with a very mildly damp cloth. Pay special attention to fans! This should increase airflow. For tricky areas such as finned heatsinks and fans, use compressed canned air with an attachment nozzle.
- 16** Clean your fans – www.techspot.com/vb/all/windows/t-52936-Repair-your-noisy-cpu-and-system-fans.html.

HARDWARE HACKING

Hands-on hints to cool, squelch and improve your hardware experience.

NTUNE IS A GREAT TOOL IF YOU OWN AN NVIDIA CPU OR BOARD.

101 WAYS



SOME HARD DRIVES NEED JUMPERS ADDED OR REMOVED TO BE PUT IN 3GB/S MODE.

101

WAYS TO HACK YOUR PC

17 Reduce vibrations by adding silicone washers to your drives, and insert a silicone sheet between your case fans/PSU and case. If you're going the complete silencing hog, encase your hard drive in something like the Scythe Quiet Drive, or SilenX Luxurae. www.pccasegear.com.au.

18 Add silencing foam to the sides of your case. A Spire Sound Pad pack will do well, and will set you back \$20-\$30 for two 40x35mm and two 40x18mm sheets. Depending on your case you may need more than one pack.

19 You can quiet down your DVD drive by slowing it to its read speed – if you can handle the slower transfers. The memory resident Nero DriveSpeed (www.cdspeed2000.com) will help you, providing it supports your drive. Samsung, Pioneer, Plextor and Sony offer tools on their websites that allow you to select speed or quietness profiles for drives.

20 Update the firmware/BIOS for your motherboard, graphics card, optical drive and even hard drive where applicable. For optical drives, in some instances you can cross-flash with a different firmware to get extra features usually reserved for more expensive models, or hack firmware to modify things yourself such as setting DVD region coding to RPC1. Your friends in this area are www.speedlabs.org, www.cdfreaks.com, www.rpc1.org and ala42.cdfreaks.com/ MCSE. If you'd prefer not to muck with your firmware to enable RPC1, consider purchasing AnyDVD. www.anydvd.com.

21 Update your drivers! This can often give access to new features or fix problems.

22 If your hard drives aren't sitting behind a fan, consider installing one – most cases support mounting a fan at the front. Make sure that your drive doesn't occupy the bay that aligns with the centre of the fan, or it will be sitting in the dead spot – you want as much air to travel over it as possible.

23 Free up your resources in the BIOS – it's just tidy. Disable things you'll never use, like serial and parallel ports. Turn off the On Boot Floppy Seek (or set the option to 'None' in newer BIOS) if you don't have a floppy. If you don't use onboard sound at all, disable it and the MIDI port.

24 Rebuild your PC – make sure everything is inserted firmly and properly. Neaten up the cabling, buy some cable management clips, rounded IDE cables, anything that increases neatness and maximises air flow.

25 Lap your heatsink. This involves sanding down the base of the HSF for a smoother surface, to allow better contact. There's a million tutorials on the Net, just Google 'lapping heatsink'. Before you begin, you'll want to clean up all the thermal interface gunk with Arctic Silver Arcticlean (clean your processor heatspreader too). When you've finished lapping, re-apply a thin layer of your thermal interface of choice.

26 If your PCI sound card is sharing an IRQ with another device, you may run into problems. Try moving it to a dedicated single IRQ PCI slot. Your motherboard manual should tell you which one is set up to not share interrupts. If all slots share resources with other components (say, the USB slots), use the one with the least shared resources, or disable the other resources through the BIOS if you're not using them. Speed problems may arise with RAID cards that are forced to share IRQs.

27 If your mouse isn't gliding like it used to, install Teflon 'mouse skates' on the bottom. Grab a professional fUnc/Everglide/Razer mousemat if you haven't already.

28 Replace your normal screws with thumbscrews, for quicker access and removal.

29 Buy some external cable ties for your keyboard, mouse and power cords – or consider going wireless so you don't have to deal with the mess.

30 Grab yourself a Razer Armadillo/Mouse Bungie to stop unwanted movements through your long mouse cable. For the cheap, just anchor it under your keyboard leg.

31 Consider setting up a RAID5 array, or 1+0 – there's no safer consumer level way to make your data secure.

32 Buy an Aeron chair – the ultimate in comfy!

OVERT OVERCLOCKING

A few things to keep in mind when striving for illicit speed.

33 If you're having trouble getting the speed you want from you Athlon 64 and you're overclocking via the FSB, make sure you wind down the multiplier of the HyperTransport Link. It's important that the link doesn't go higher than 1000MHz, as it'll make your system unstable.

34 Voltage is a great thing to ramp up to improve system stability when you're overclocking, but even a tiny increase in voltage can exponentially increase heat output. There's no point in having a super fast overclock if you're killing half the components in your system. Either invest in water-cooling, air-cooling, or moderate your voltage increases.

35 There's nothing wrong with loosening timings to get more MHz from your RAM. As long as you're running at 1T, that's the important thing.

36 If you've bought a Core 2 Duo and compatible motherboard, along with 1066MHz-rated DDR2 RAM, and it's as stable as a rickety house on a raging river, lower the RAM speed or loosen the timings. DDR2 has yet to be ratified by JEDEC, so don't count on it being reliable at its rated speeds.

UBER UPGRADING

Objects you must buy for your PC.

37 Replace your case fans with Nexus Real Silents (80mm, 92mm or 120mm) from www.pccasegear.com.au.

38 Buy a second monitor for some dual loving. You'll never look back when you can put all your secondary apps on a dedicated screen. Never. Plus, Supreme Commander commands you to own two monitors, so there.

39 Core 2 Duo – it can't be overstated how fast these things run. If you can afford a new CPU + motherboard + RAM, you won't look back when the time for Vista



IT'S A GOOD IDEA TO GIVE YOUR PC A CLEAN EVERY SO OFTEN. AND YOU SCREEN. OH, AND YOUR DESK AS WELL

finally comes. Buying a DirectX 10 card is a bit of an unknown at the moment despite the 8800GTX, as there are no applications for us to even begin to guess at the performance of such things.

40 Buy a good mouse. We recommend Logitech's MX series, particularly the 500s, and the G5. These babies serve well as general and gaming mice.

41 If you're planning on upgrading to Vista and want EAX support, make sure you grab an X-Fi. At the moment, it's the only card that Creative has Vista drivers for that enable EAX, and it's not known at this time whether EAX-enabled Audigy or Live drivers will be made available.

42 DVD burners are insanely cheap. Insanely. You shouldn't have to pay any more than \$50 or \$60 for one. Hit up your local computer shop for Pioneer's DVR-111. As for media, Taiyo-Yuden simply cannot be beat. Just make sure you're getting the real thing, as fakes are everywhere.

43 Invest in at least a 500W brand name power supply. If you value your \$1000 video card, you will not skimp on a PSU. Trust us – don't go cheap. You will regret it.

REGISTRY RUMMAGING

Core Windows hacks for the brave. Hey, performance has a price.

44 Since Windows 2000, the OS by default likes to change the case of files and folders you create (particularly those in all caps) to look more visually appealing. This can be a nightmare for web developers or those who use case sensitive operating systems – so head to **HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced** and change **DontPrettyPath** to 1.

45 Eliminate the Start Menu delay. Old but good. Why wait for Windows to slide those menus open when they can do so much quicker. Hack the registry and tweak these settings:

[HKEY_CURRENT_USER\Control Panel\Desktop]

"MenuShowDelay"="10"

[HKEY_USERS\.DEFAULT\Control Panel\Desktop]

"MenuShowDelay"="10"

Set these to whatever you want: 20 and 40 are good values.

46 Speed up network browsing. Yes, Windows slows down network browsing, for no good reason, by checking if other computers have scheduled tasks. Who cares! Delete the following registry key to rid yourself of this: **[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Explorer\RemoteComputer\NameSpace]{D6277990-4C6A-11CF-8D87-00AA0060F5BF}**

47 If you reinstall your OS often, or you'd just like to keep all your registry tweaks together, create one big REG file and put it all in there. Windows will happily import them all. So, instead of having to manually re-enter tweaks like we've shown here, you can double-click on one file and be done. Just remember to put the registry editor header at the top of the file (easily generated by using the export function in Regedit).

48 The Windows Search feature can fail completely if you don't run the indexing service. Files with unknown extensions will not be looked

at if you perform a 'text inside a file' search. To fix this, Regedit to **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\ContentIndex** and change **FilterFilesWithUnknownExtensions** to 1.

49 Are you running a pre-Windows 2000 OS and finding that the keyboard takes forever to process a stroke? You can boost the amount of time applications spend reading from the keyboard with a tweak to the system.ini file. Go to Start -> Run and type 'sysedit'. Once the program starts, select the system.ini file and, under the [386Enh] heading, add the following:
KeyBoostTime=.005

The default setting for this is .001, so tweak it up and down until the keyboard is at the responsiveness you prefer.

50 That Shared Documents folder in My Computer given you a bad time? You can get rid of it by deleting the subkey **{59031a47-3f72-44a7-89c5-5595fe6b30ee}** under **HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Explorer\MyComputer\NameSpace\DelegateFolders**.

WINDOWS WARPING

What Microsoft couldn't do itself.

51 Roll your own Windows – invest some time in nlite (www.nliteos.com) or vlite (www.vlite.net), to create your own perfect Windows install.

52 Install a codec pack – we find K-Lite Mega (www.free-codecs.com/download/K_Lite_Mega_Codec_Pack.htm) to be the best, and it also bundles Media Player Classic, our favourite player. This will ensure that you'll be able to play almost every video/audio file you come across. Should you run into problems, you may also wish to try VLC (www.videolan.org).

53 Turn off User Account Control in Vista – it gets in the way and can break older programs. You'll find the option to turn it off in Control Panel -> User Accounts. This should be the last time you have to authorise an action – restart and you're back to the good(?) old days.

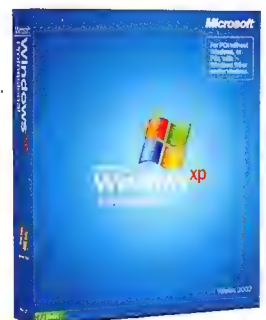
54 Double up on your sound card – if you have onboard sound and a dedicated sound card, you can pump system sounds through one and say, Winamp entirely through the other – so you can mute system sounds quickly and effectively and never have them interrupt the music.

55 Sometimes programs have trouble communicating with your optical drive – this is likely your ASPI layer, or lack of one, that's causing the trouble. While you can use ForceASPI (radified.com/ASPI/forceaspi.htm), we've found much better compatibility with the Nero ASPI dll (wnaspi32.dll), which you can find at www.nero.com/nero7/enu/ASPI_Driver.html. Now you can drop it into the folder of the program that's causing you troubles. Of course it'd be better if you dropped it into C:\Windows\System32 so it'd be accessible to everything, but Nero doesn't want you doing that, so you won't, right?

56 Get your Windows XP games running in Vista. A new Microsoft OS is out, but not every game runs on the damn thing. You have a number of solutions:
1. Install DirectX 9. Yes, it'll happily sit on top of DirectX 10.

101 WAYS TO HACK YOUR PC

101 WAYS



**WINDOWS
XP HAS SO
MANY GREAT
TWEAKS,
IT'LL MAKE
YOU WONDER
HOW YOU
DID WITHOUT
THEM.**

101

WAYS TO HACK YOUR PC

2. Do this registry hack to disable multithreading with NVIDIA drivers: **HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Direct3D "DisableThreadedDDI"=dword:00000001**
3. Grab the latest Vista Forceware from www.guru3d.com.

57

You can add your own programs to the Control Panel with YourCPL (www.iansharpe.com/downloads.php).

58

Install TweakUI – after all these years it's still useful for quick access to settings that would otherwise require registry hacking (www.microsoft.com/windowsxp/downloads/power toys/xppowertoys.msp). Don't forget to set the Command Prompt directory and filename autocomplete to Tab for easier browsing Linux style.

59

Turn on QuickEdit mode in the Command Prompt. Open up a Command Prompt window, click on the icon in the top left and choose 'Properties'. Check 'QuickEdit Mode', hit OK and select the Modify shortcut option. You can now select text (left click drag), copy it (right click selected text) and paste (right click) in the Command Prompt window.

60

Stop programs loading with Windows that shouldn't – go to Start -> Run, type msconfig.exe and hit enter. Go to the startup tab and make sure there's nothing untoward in there. In Vista, greater functionality is included in Windows Defender – go to Control Panel -> Security, load Windows Defender and go to Tools -> Software Explorer.

61

Save yourself the trouble of re-activating Office 2003 and just back up the activation data. Make backups of data.dat, opa11.bak and opa11.dat, found in the C:\Documents and Settings\All Users\Application Data\Microsoft\Office\Data folder, and just copy them back over when you reinstall. Note that these files will only work with the system and Office copy they are bound to. So no naughtiness.

62

Windows comes with its own powerful command console. And no, we're not talking about CMD.exe (but we will later). Go to Start -> Run and type in 'mmc'. An empty window will appear. Next go to File and select Add/Remove Snap-in, hit the Add button in the window that appears, and go ahead and create your own custom system console. We recommend Disk Manager, Event Viewer and the Group Policy editor as good additions, but feel free to add your own. You can then save the console as a file for quick recall later.

63

Having hardware conflicts or experiencing weird behaviour when installing stuff? Try getting rid of old device drivers and registry settings via Windows' Device Manager. Right-click on My Computer and select Properties. Then click the Hardware tab followed by the Device Manager button. When Device Manager appears, go to View and select Show Hidden Devices. If you haven't reinstalled Windows in a while, or pull out and install new hardware all the time, there should be quite a lot of crap. Feel free to right-click and select Uninstall on anything you know isn't installed. You can also be extra thorough by going into Safe Mode, which will show a bunch of additional drivers and entries protected while under normal operation.

64

Nero 7 installs Nero Scout. While it can be disabled via its own options, it will still linger like a bad smell. To get rid of it completely, type this into Start -> Run:

```
regsvr32 /u "%commonprogramfiles%\Ahead\Lib\MediaLibraryNSE.dll"
```

There, all gone.

SOFTWARE SHIFTING

Programs you must own to make your computing life easier. And cooler.

65

Forgotten your passwords, but still have it stored in a program behind those annoying asterisks? Password Revealer (www.simplissoftware.com) should help.

66

You'll want a better text editor than Notepad, specifically something that can handle UNIX encoded files. Favourites at Atomic are Notepad++ (notepad-plus.sf.net) and Crimson Editor (www.crimsoneditor.com).

67

If you need to partition your hard drive and can't afford Partition Magic, give the GParted Live CD (gparted.sf.net) a go. You could also try the tools included on the Knoppix Live CD (www.knoppix.com) or the Ultimate Boot CD (www.ultimatebootcd.com).

68

Set up an automated backup system – either to move data to your RAID setup, or if you don't have one to copy it elsewhere for safety. Cobian Backup (www.educ.umu.se/~cobian/cobianbackup.htm) should automate absolutely everything for you with minimal setup.

69

If you're still using a CRT monitor, you'll probably have run into the 60Hz bug, meaning that once 3D is enabled the refresh rate of the monitor drops to 60Hz. The best way to fix this, for both OpenGL and Direct3D, is to install RefreshLock (www.pagehosting.co.uk/rl), run it resident and force the refresh rates you want per resolution.

70

Copying over the network or from unreliable sources can be a pain. KillCopy (killprog.narod.ru/killcopye.html) will help this, with a tonne of options. Use a download manager to grab it, as the server is very slow.

71

Speaking of which, grab a download manager! www.freownloadmanager.org is probably the best free one you can get.

72

Install Folding@Home, and donate your spare CPU cycles to fight against disease! folding.stanford.edu

73

Ever wanted to create PDFs, but can't afford the full version of Adobe Acrobat? Download CutePDF Writer and Ghostscript here: www.cutepdf.com/Products/CutePDF/writer.asp and then simply print to PDF. Brilliant!

74

Then there's the reading of PDFs – while Adobe Reader is fine, you'll find Foxit PDF Reader is a lot quicker to load and uses considerably less resources. You can find it at foxitsoftware.com/pdf/rd_intro.php.

75

Keep useful software with you wherever you go – on your USB key! A list of useful portable programs can be found at www.atomicmpc.com.au/article.asp?SCID=21&CIID=39748.

76

Run CrapCleaner (www.ccleaner.com) to remove unwanted data from your drive such as browsing history, temporary data and cookies. You can also use



WHILE A REAL SHIELD WON'T DO YOU MUCH GOOD AGAINST A VIRUS ATTACK, THERE ARE PLENTY OF FREE APPS THAT WILL

it to clean up your Add/Remove Programs control panel if you now have broken links there.

77

Wondering where all your hard drive space has gone? Use SpaceMonger (www.sixty-five.cc/sm) to find out! You'll want the older 1.4.0 version – it's free.

78

Install a virtual machine. Virtual PC is now free (www.microsoft.com/windows/virtualpc/default.mspx), so long as you pass the WGA check. The advantages of a virtual machine are many – a sandbox environment in which you can test or break things without damaging your host OS, being able to run multiple operating systems, down to even running old games in a compatible environment.

79

Install a firewall. If you're not running an external Linux or hardware firewall, it's worth setting up your own internal software one. The excellent Sygate Personal Firewall (www.majorgeeks.com/download.php?det=3356) is now discontinued, but it still does the job admirably. Those put off by the lack of updates may wish to check out Filseclab (www.filseclab.com/eng/products/firewall.htm). Those in favour of complexity will fall in love with R-Firewall (www.r-firewall.com).

80

Microsoft Office costs money. Most already know about the free and reasonably good alternative provided at OpenOffice.org. But did you know that you can do word processing and spreadsheets online, able to access your documents anywhere there's an Internet connection? Head to docs.google.com for instant increased production.

81

Install Sysinternals' Process Explorer! Kill applications that Task Manager can't, view exactly how much memory, real and virtual, an app is using, and track down and kill open handles in Explorer that prevent you from deleting files and folders. Grab it here: www.microsoft.com/technet/sysinternals/utilities/ProcessExplorer.mspx

82

Sysinternals also has Autoruns, which shows you everything that starts up with Windows. And we mean device drivers, Browser Helper Objects, services... the lot. If you think something's starting with Windows that shouldn't, download Autoruns from the following URL and kill it: www.microsoft.com/technet/sysinternals/Utilities/Autoruns.mspx.

83

ExamDiff and BeyondCompare are two very cool programs for comparing files, and directories of files respectively. Excellent tools for the programmer, but also for a bit of comparing in your day-to-day activities. ExamDiff is available here: www.prestosoft.com, while BeyondCompare can be downloaded here: www.scootersoftware.com.

DOS/SCRIPTING SHENANIGANS

Meaty scripting and Command Prompt skills. Impress friends and blind women.

84

Windows comes with its own scripting engine, and if you know a little Visual Basic it's easy to use. For example, if you want to make a message box appear on screen with the text 'Hello' inside, just create a new file on your desktop, name it 'hello.vbs', open it in Notepad and type in and save this text:

```
msgbox "Hello!"
```

Now, just double-click on hello.vbs and a message box will appear! For more info, visit tinyurl.com/9hlaq.

85

Using Windows' own Start command and a batch file, you can force programs, like games, to run with realtime priority. This will kill the speed of anything running in the background, such as virus scanners and the like so be sure to turn them off before doing this. First, create a file called 'startgame.cmd' and open it in Notepad. Then, type the following:

```
@ECHO OFF
```

```
START /REALTIME /MAX GAME.EXE
```

Where 'GAME.EXE' is the game executable. Next time you go to play, use the startgame.cmd batch file.

86

With Windows XP, SP2 is a neat and powerful command called 'netsh' that can perform a bunch of network-related functions. One, 'netsh winsock reset' can be used to fixed corrupted Winsock settings that can break network connectivity. So, next time your Net connection goes down, and nothing is working try this command, reboot and see if it works. If not, download the Winsock Fix utility from here: www.snapfiles.com/get/winsockxpfix.html.

87

ExamDiff and BeyondCompare are great, but they're not always available. Luckily for us, the DOS emulator in Windows, the great cmd.exe, comes with it's own basic file compare tool. Called 'fc', the syntax is as follows:

```
FC FILE1 FILE2
```

Easy enough, yes? You can add a '/B' before the filenames to make the comparison binary (good to find changes in save games), and you can add '> comp.txt' to pipe the results to a text file instead of the screen for perusal in your favourite text editor.

88

Before the days of virtual drive tools, such as Daemon Tools, the old school thing to do was use SUBST. You can still use it today. Basically, you can assign a drive letter to a directory, effectively tricking the operating system into seeing the directory as a hard drive. To do this type the following into a Command Prompt window:

```
SUBST x: c:\windows
```

This would create a new drive, X, with the contents of path C:\Windows. To remove the drive type:

```
SUBST /d x:
```

101 WAYS TO HACK YOUR PC

101 WAYS

**OPENOFFICE
IS A GREAT
OPTION OVER
MS OFFICE,
BECAUSE IT'S
CHEAP. AND
BY CHEAP,
WE MEAN
FREE.**



101

WAYS TO HACK YOUR PC

IF TWO
CORES
AREN'T
ENOUGH,
TRY 1000
INSTEAD.



89

Another command available via Windows' DOS emulator is FINDSTR. It can search a file or a number of files for a string of text. It includes support for regular expressions and multiple types of output. To use it, just type the something like the following into a cmd.exe session:

FINDSTR /r /n "day[2-4]" holiday.txt

This would find the text 'day2', 'day3' and 'day4' in the file 'holiday.txt' and print the line number that text was found on. Type 'FINDSTR /?' for a list of switches and other options.

90

If you're feeling particularly daring, give CMDOW a try. Available from www.commandline.co.uk/cmdow, CMDOW gives you complete control over how windows are opened, sized and given focus. It's also batch-friendly, and its output can be easily read with standard DOS commands.

GAMING GIGGLES

General gaming tips for speed, power and profit.

91

Even with the latest graphics hardware, game engines have yet to render shadows in a resource and performance-friendly way. For easy frames, the best thing you can do is disable in-game shadows. Trust us, it's probably the single biggest performance boost you'll get.

92

If you're still getting below average performance, make sure antialiasing is disabled both in-game and in your graphics card's control panel. If forced via the control panel, the game will ignore whatever settings you've configured via its own graphics options.

93

2007 will be the year of the dual and quad core CPU. Games such as Supreme Commander take full advantage of every core your supply them with, so now is a good time to think about upgrading. And, with both Core 2 Duos and Athlon 64 X2s at insanely good prices, you'd be silly not to contemplate at least an interim upgrade.

94

Games don't update themselves (well, those with autoupdate programs do). Visit the developer's/publisher's website and get the latest version.

95

If you want to back up your saved games but can't seem to find them in the game's main folder, check the My Documents folder in both your own Documents and Settings directory and 'All Users'. Failing that, check the Application Data and Local Settings folders.

96

Many games these days store their settings, including scenarios, AI and item info in human-readable format. With scripting languages such as LUA and Python and runtime compilation gaining traction in development circles, it's as easy as pie to tweak a game exactly how you want it. If, say, searching for an official patch for widescreen support turns up trumps, go rummaging in the game's main folder or data folders for INI or CFG files and search for resolution-related settings. You'll be surprised by what you can find.

97

Vertical sync is great for getting rid of visual 'tearing' as frames switch from the back to the primary buffer. Unfortunately, Vsync can also adversely affect performance. To negate this performance loss, enable triple buffering, either from your graphics card's control panel or in-game. Force it if you have to.

98

Some people like to cheat and, hey, we're not going to crucify you as long as you keep your nasty cheating ways offline. Not all games come with cheats or trainers, but there are two ways around that:

1. Hack your saved game. Not easy in this day and age, as many games, such as Titan Quest, use checksums to check file validity. Others use compression and a few, encryption. If you do decide to go down this route, the best tools to use are FC (see tip 87) and Hexplorer (sourceforge.net/projects/hexplorer). Just make a copy of your saved game, earn some money, save again, and then compare the two with FC. Make the necessary changes using Hexplorer, and you're done.
2. Use memory editing tools to alter the game as it runs. Freeware tools like this are hard to come by, but of the demo versions we recommend ArtMoney. Go to www.artmoney.ru for more info.

99

Looking for a walkthrough? GameFAQs (www.gamefaqs.com) is an excellent resource.

100

If you keep your games on a partition/drive separate to that of your system files, and you decide to reinstall your OS, you don't necessarily have to reinstall your games as well. Many keep their data in the registry, and in the user directories of Documents and Settings, but a few can recreate this information just by starting them. Examples of such games include World of Warcraft, Neverwinter Nights 2 and Elder Scrolls 4: Oblivion. So before you sit and reload your multi-gigabyte game just for a few registry entries, try playing them first.

101

Subscribe to *Atomic* magazine! This is the best tip in the entire guide, without a doubt. If you want more tweaks, tutorials, guides, products roundups and hardcore tech, *Atomic* is the only way to go. To make sure you're getting us every month visit www.atomicmpc.com.au/subscribe.asp and sign up now!

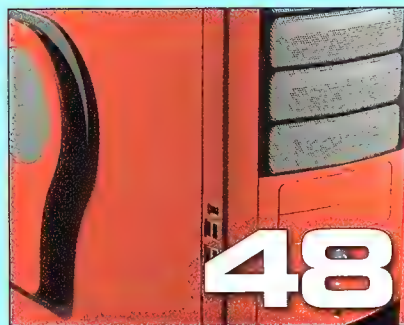
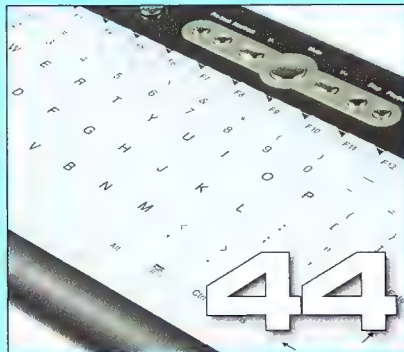


HARDCORE

NEWS, REVIEWS AND ROUNDTUPS ON THE LATEST HARDWARE

After the craziness of NVIDIA month last issue, we've settled down into the usual hardware routine. While 8800 still rocks our socks, we expect we won't see AMD's R600 for at least another month. That's okay – until Crysis comes out we won't understand the true nature of DX10 anyway. And even

that's been delayed past its original April release date. We have ASUS' flagship Extreme Striker this month, its 680i board. Blu-ray gets a shot courtesy of LG, we have some stonkingly fast RAM thanks to Apacer, and MSI's 7900GTO beastie proves that GTX can be had on the cheap. Start flipping pages!



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That sure is a lot of heads in the heading

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Dan Rutter coordinates a coordinates attack

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Irwin F430

Antec 900

Gigabyte GA-965P-DS3

MSI 965P Platinum

MSI 7900GTO

Apacer PCZ-8500

LG GBW-H10N

Optoma Movie Time

Thermaltake Lanbox

ASUS DRW-1612BL

Tagan TurboJet TG1100-U95

ASUS X16SDXT

DOUBLE THE CONTENTS

Win an X-Fi Elite Pro sound card!

www.atomicmpc.com.au/competitions

With our fantastic sound feature (flick back about a dozen pages, you can't miss it), we thought it'd be a good idea to give away one of Creative's X-Fi cards – and the Elite Pro, of all things. If you'd like a chance to win the greatest gaming sound card on Earth (now with extra greatness) just visit the URL above, click the X-Fi Elite Pro link, and answer the question you find there. Cheers to Creative (au.creative.com)!

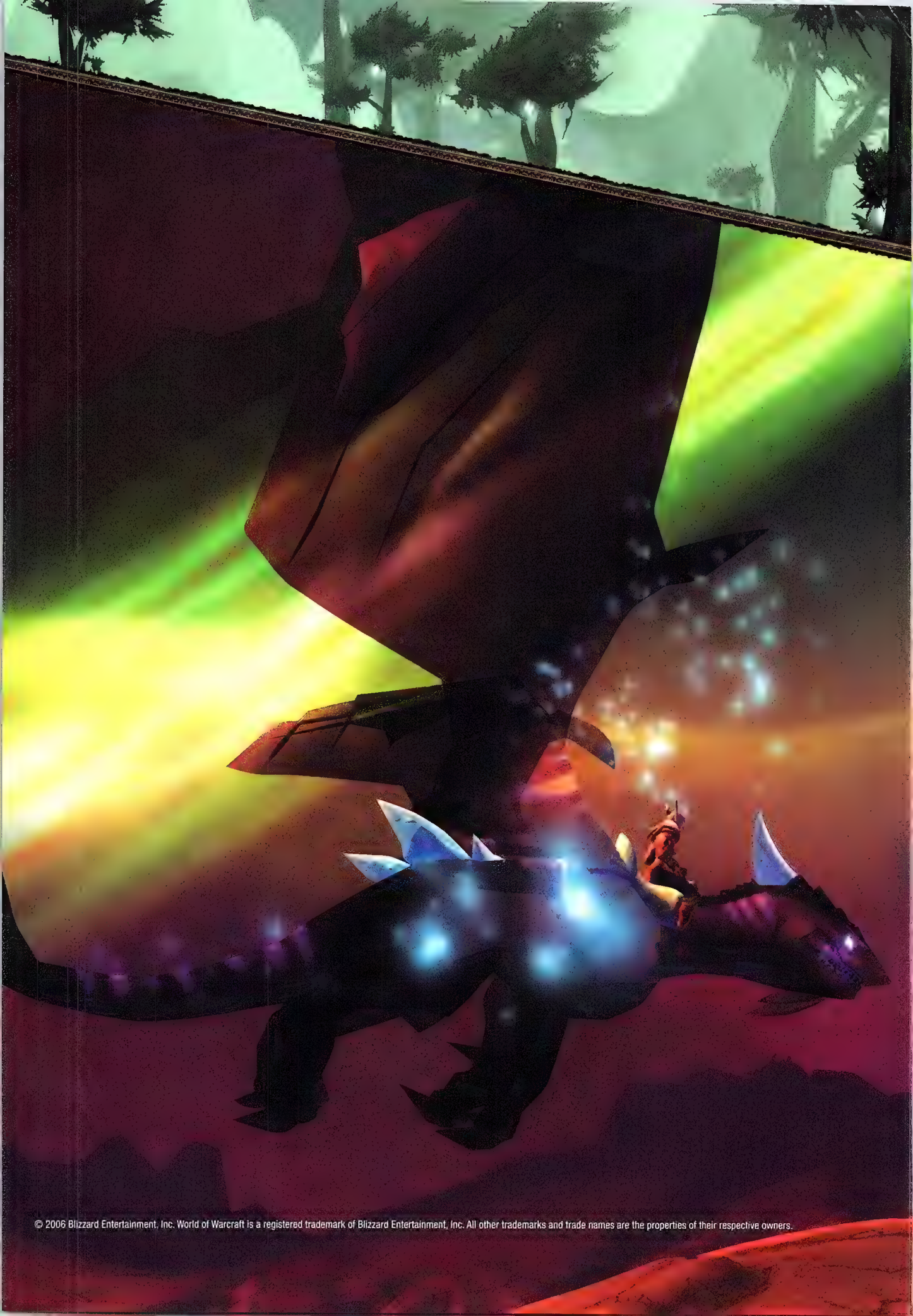


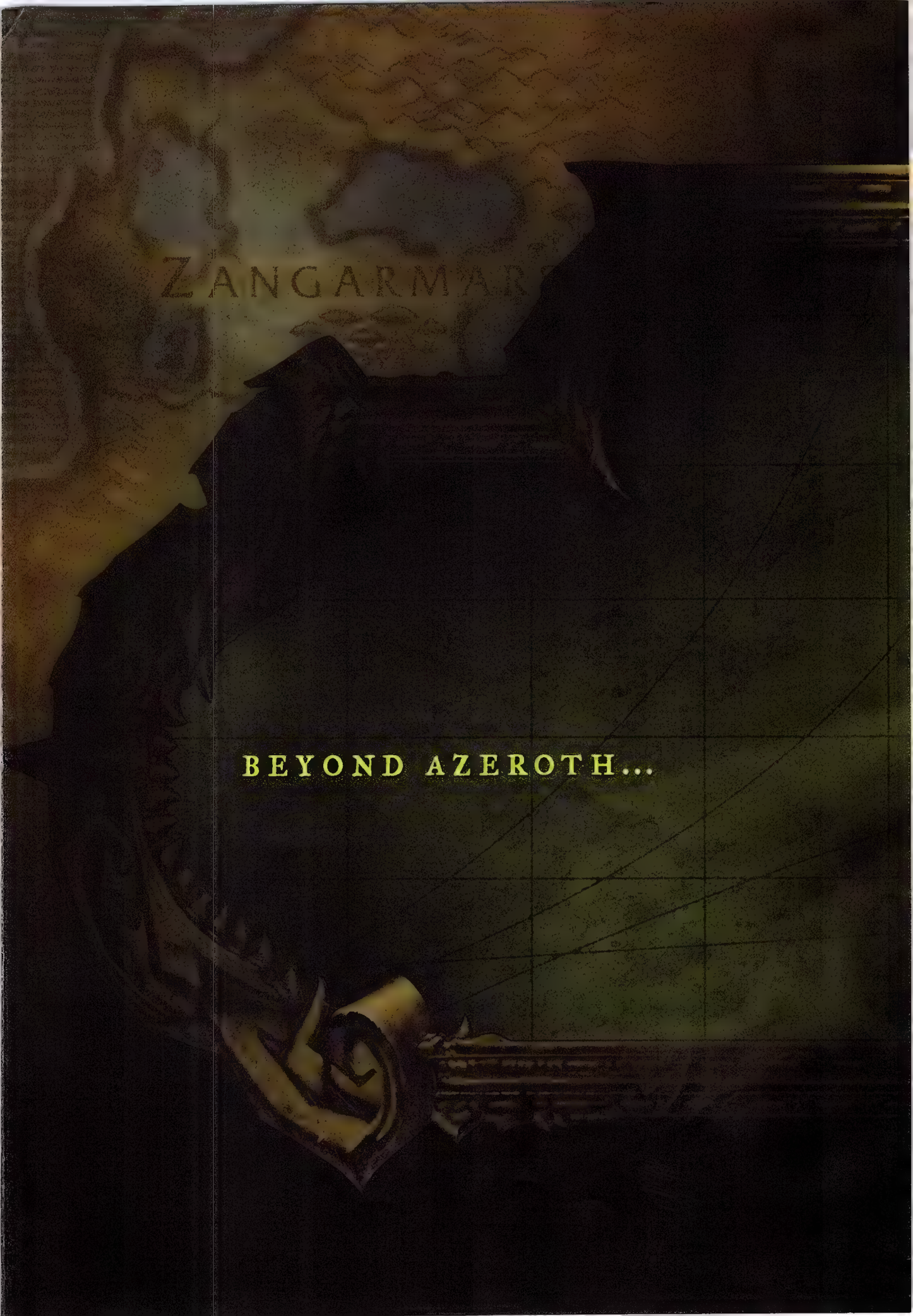


NAGRAND

TEROKK
FOR

OUTLAND





ZANGARMAR

BEYOND AZEROTH...

BENCHMARK

How we test,
what we test,
when we test it

3DMark05 and 06 are the legs of our bench. As freely downloadable tools, they allow people all around the world to compete on a single platform, regardless of its indication of real world application, and its ability to keep our table stable.

On the gaming surface, Call of Duty 2 takes first honours in the FPS department. Quake 4 follows closely behind for our OpenGL benchmarks, taking over from where the venerable Doom 3 left off and offering multiple CPU optimisations. Half-Life 2 remains, its market penetration simply too huge to ignore. X3: Reunion makes an appearance, in an effort to have a benchmark that is not an FPS. In the same line, Splinter Cell: Chaos Theory has also been added. Other games do exist. Honest.

All tests are run at 1280x1024, 1600x1200 and 1920x1200 with vsync off, to cater for the most popular LCD resolution, CRT resolution and those who own widescreen monsters respectively.

To hit the CPU, we use LAME MT, a multithreaded version of the popular MP3 encoder, which is used to compress a standard 30-minute WAV file. Similarly, VirtualDubMod is used to compress a standard 1GB raw video file into XviD at 1300Kb/s. Other CPU specific tests in our stable are Maxon's CineBench and SuperPi Mod. Rounding out the suite, SiSoftware's Sandra tests several subsystems across the board, while HDTach and ATTO Disk Benchmark helpfully provide hard drive scores.

All these tests are run on a Windows XP SP2 platform, running the latest official drivers available. Every test is run three times to eliminate any oddities that may crop up along the way, the final result printed in the magazine being an average of those scores.

Of course, all this is pointless without a standard set of hardware, and as such it is laid out below for the world to see. On with the testing!



The Atomic Hot Award is given only to the best. In our roundups, we differentiate the best further using the following awards:

VALUE AWARD This means the product is the best buy price-wise.

PERFORMANCE AWARD Price isn't a big factor – it just has to make our benchmarks burn and our eyes water.

EXTREME AWARD Forget everything. If it's mind-blowingly amazing, then it'll get an Extreme Award.

BENCHMARKS

Graphics

3DMark05

Game tests only, 4xAA, 8xAF
www.futuremark.com

3DMark06

Game tests only, 4xAA, 8xAF (SM2.0), 8xAF (HDR/SM3.0)
www.futuremark.com

Half-Life 2

Canals custom timedemo, 4xAA, 8xAF, all details highest, HDR off
www.half-life2.com

Splinter Cell: Chaos Theory

Lighthouse Demo, Shader Model 3.0, 8xAF, shadow resolution high, all features on
www.splintercell3.com

X3 Rolling Demo

High settings, auto quality control disabled, glow enabled, 4xAA, 8xAF
www.egosoft.com/games/x3/info_en.php

Call of Duty 2

Hill 40 – Defend custom timedemo, 4xAA, 8xAF, all options highest
www.callofduty2.com

Quake 4

High quality, 4xAA, 8xAF, Multiple CPU support, all options highest
www.quake4game.com

Subsystems

HDTach

www.simplissoftware.com

LAME MT

softlab.technion.ac.il/project/LAME/html/lame.html

VirtualDubMod

virtualdubmod.sf.net

SuperPi Mod

www.xtremesystems.com/pi

Cinebench

www.cinebench.com

SiSoft Sandra

www.sisoftware.co.uk

Everest

www.lavalys.com

Others

DisplayMate

www.displaymate.com

ATI Tool www.techpowerup.com/atitool

RivaTuner

www.guru3d.com/rivatuner

FRAPS

www.fraps.com

CPU-Z www.cpuid.com

Stress Prime 2004
sp2004.fre3.com

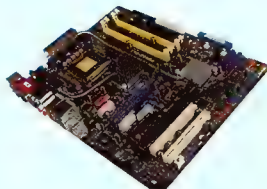
ATOMICBENCH Our standard hardware that gets regular labs lovin'.

intel



▲ Intel Pentium 955 EE

ASUS



▲ ASUS P5N32-SLI Deluxe

OCZ Technology



▲ 2GB OCZ PC2-4200EB

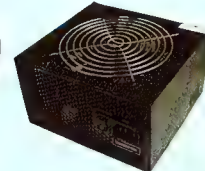
WD

Western Digital

PC Case Gear



▲ Western Digital 1500ADFD



▲ Seasonic S12 600W

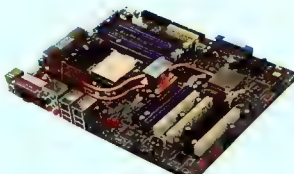
AMD

ASUS

OCZ Technology



▲ AMD Athlon 64 FX-60



▲ ASUS A8N32-SLI Deluxe



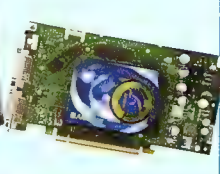
▲ 2GB OCZ PC-4000EB

DELL

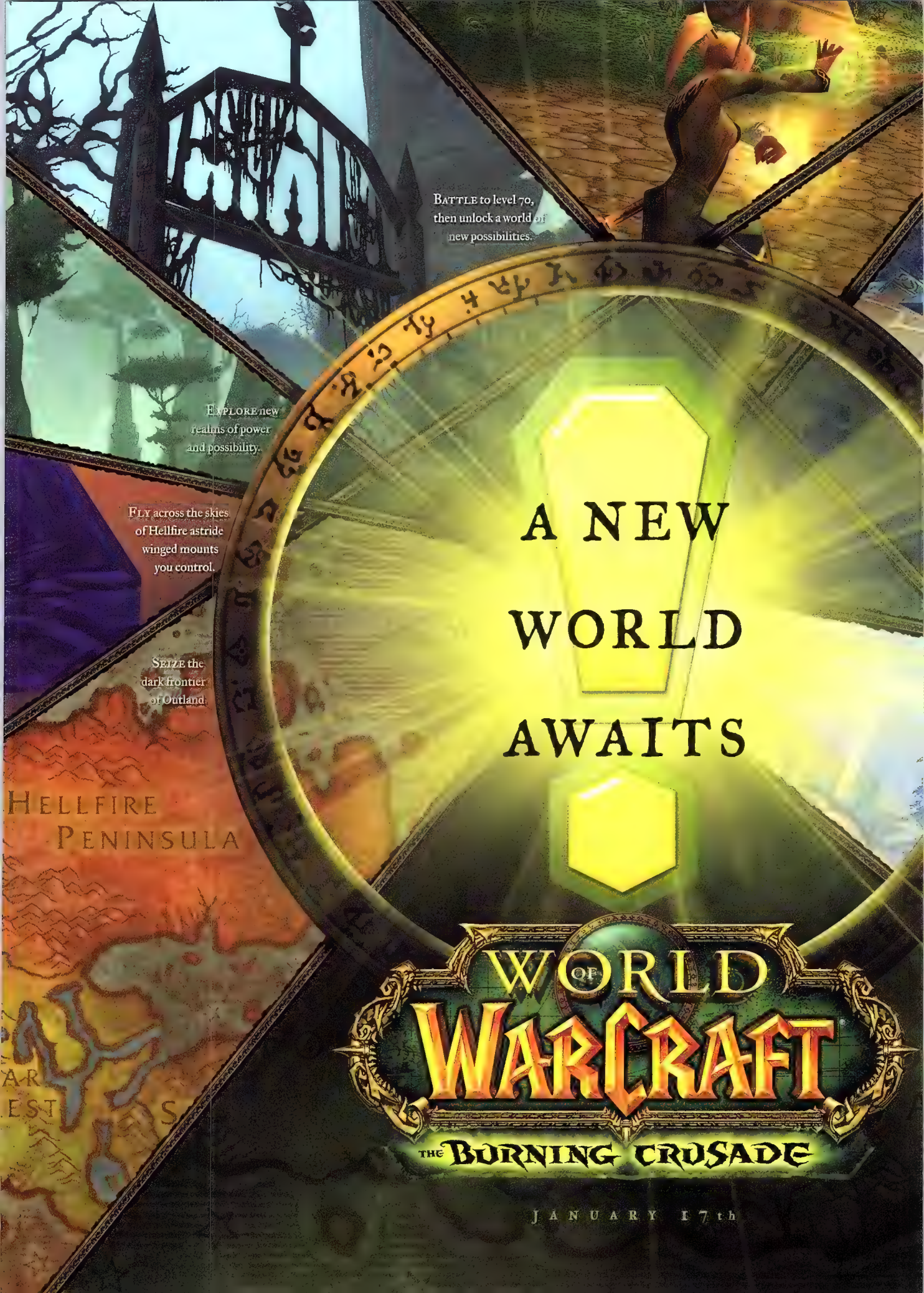
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▲ Dell 2405FPW



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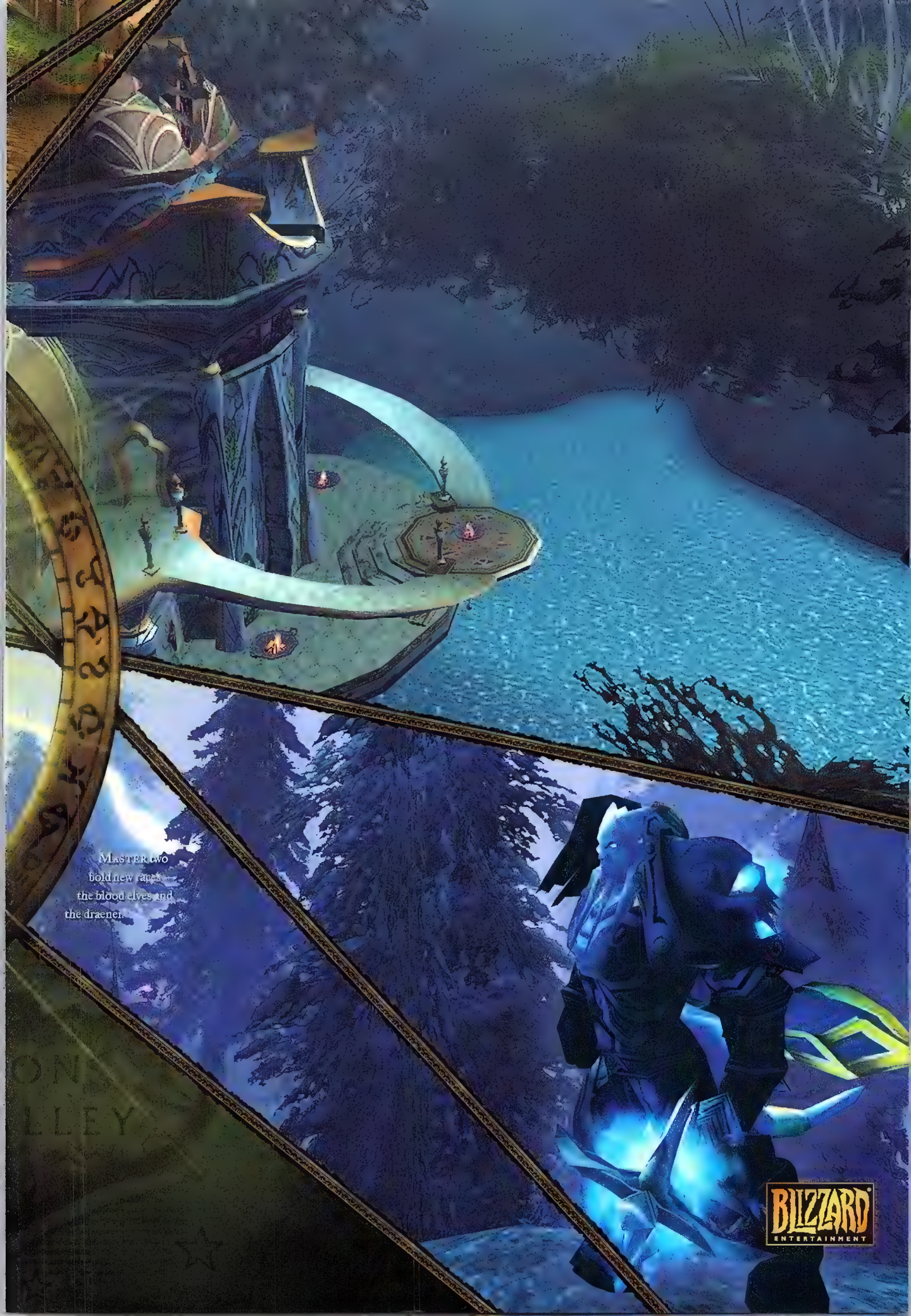
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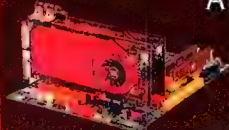
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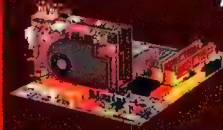
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HARDCORE

HEAD TO HEAD

beyerdynamic

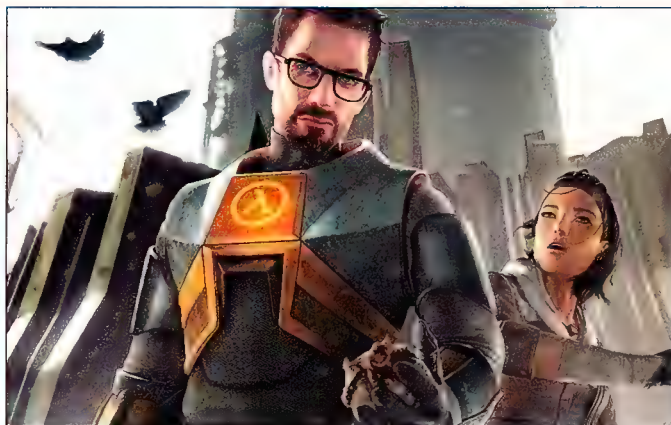
GAMING HEADPHONES

Every PC gamer needs a good set of headphones. Period. It doesn't matter how amazing your soundcard setup is. There will always come a time when you want to disappear into the game, eliminating every last distraction in favor of complete immersion into times past, future or hellish war; it might be the family circus, the zombie having monkey sex, or the LAN party in LA swing. A game designer would blood to bring you that about now, so the least you can do is get inside it.

We aren't going to talk games while delivering some roundup that examines units by listening to MP3s and watching DVDs. No, no, not this is all about the gaming, and while we are looking at many of the top headphones under \$300—and a couple over—we won't be sending you home with advice on what set will make for a nice all-around good buy. We are here to find your gaming courtesan. The illustrious set of phones you keep on the side for that solitary night (if you'll pardon the tautology) over a keyboard and under the watchful glow of the Source engine.

So what are we misapprehending? Gamers don't need total-out perfection above the audible range. It is about two major factors: Fidelity and sound stage.

Fidelity gives you a faithful interpretation of the sounds in the game, letting you focus on the audio cues you need within the dotted environment to stay alive a sec.



▲ Whether it's *World of Warcraft* (left) or *Half-Life 2* (right), you'll want some kick-arse 'phones to really immerse yourself in the action.

Sound stage is the sense of stereo space around you. We don't want the sound to feel like it is mainlining down the ear canal – we'd wear earbuds if we wanted that. The better the sense of true space, the more the game environment can be explored through the ears as well as the eyes.

It's also about a lot more than the audio, as essential as that is. We are looking for excellence in comfort for long playing sessions, and a little bit of tilt for the options that are going to look good at a LAN. Because when you pwn, you pwn in style.

There are no powered headphones in the collection, nor any surround sound. We are after the best single jack option to suit any gamer. There are a few mics in the mix as well. Not every gamer wants or needs one. Don't worry – the verdict should keep everyone happy.

How we tested

All headphones ran through a battery of different games to get a diversity of sound environments: *World of Warcraft*; *Dark Messiah*; *Half-Life 2* and *Rise*

of *Legends*. In all, we had music playing at a low setting (running iTunes in the background where internal music was necessary) to push audio complexity up for better examination of clarity and fidelity. We listened for subtlety, and for clarity of important cues like footfalls and gunshots, and how quickly we could pinpoint their sources.

We played with the volume levels on all sets too, searching for what felt like a natural comfort zone, while cranking it now and then to see what sets could handle when you feel the need to incur permanent hearing damage. No equalisation was tweaked in any way to suit a particular set of 'phones.

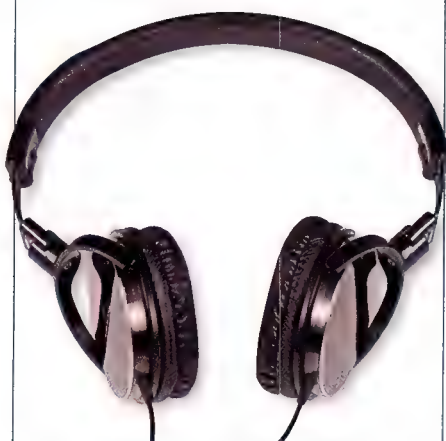
Note the head on which the 'phones were tested is bigger than average. Some headphones that were a little too small may be just right if you are not blessed with the same cranial capacity as us (or rocks, tests pending). Of the larger 'phones, none seemed so big as to warrant warning people with lesser skulls.

Headphones were also classed as 'open' or 'closed'. Open headphones aren't as sealed as closed sets and lend to a more natural sound while closed sets keep the noise in your head and can sound muffled or boxed in.

Audio Technica ATH-ES7

Price **\$249** Supplier **TAG**
Website **www.tag.com.au**
Class **Closed** Microphone **No**

The ATH-ES7 is a compact set, with a sleek chrome look that pleased all eyes. However, the portability factor quickly translates into discomfort. Just. Too. Small. But the sound quality is very high, with excellent detail in the sound, though not quite all encompassing – due to it pushing on the ear rather than cupping it.



Audio Technica ATH-PRO500

Price **\$275** Supplier **TAG**
Website **www.tag.com.au**
Class **Closed** Microphone **No**

Very good sound out of these relatively compact phones. Over time they seem to apply a lot of inward pressure, which leads to things getting uncomfortable after about half an hour. Not very deep backed, which might explain the more claustrophobic sense of space. Still, excellent clarity and reproduction.



Audio Technica ATH-PRO700

Price **\$375** Supplier **TAG**
Website **www.tag.com.au**
Class **Closed** Microphone **No**

You will look the goods at any LAN session, with a camo finish Chuck Norris would die for – if he could die. A little too small, but this only factors in towards the end of an extended session. Fidelity is very good, with a great sense of sound stage in a package almost identical in size to the PRO500, but with the annoying partial coiled cable.



Audio Technica ATH-A900

Price **\$299** Supplier **TAG**
Website **www.tag.com.au**
Class **Closed** Microphone **No**

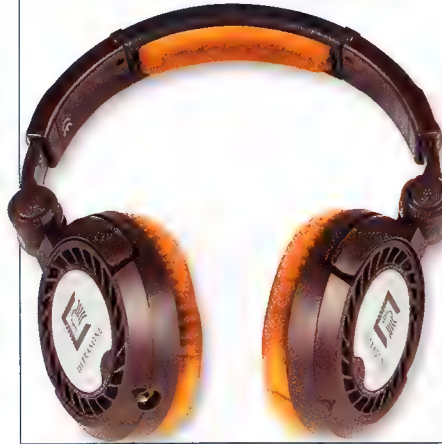
A unique self-fitting system that is the best of all offered here, giving the 'phones a gentle but exacting placement. Heavy in the hand, they were surprisingly light once on, with excellent comfort overall. The fabric covered cable was very easy to manipulate. The sound stage was definitely the best of all closed back options tested, and fidelity was excellent.



Ultrasone HFI-2200ULE

Price **\$429** Supplier **East Coast Audio**
Website **www.eastcoastaudio.com.au**
Class **Open** Microphone **No**

An interesting spiralled style on these open backs, along with a Zune brown plastic – you'll love it or hate it. A velvety finish on the cushion material made for excellent comfort throughout the session. Very good sound stage and fidelity from quite a shallow cup, using the open back for that broader feel. More for audiophiles than gamers at this price.



Ultrasone HFI-700 DVD

Price **\$299** Supplier **East Coast Audio**
Website **www.eastcoastaudio.com.au**
Class **Closed** Microphone **No**

Of all the top end models, these are the most disappointing. We ignored price points as best we could during testing, and these were at first assumed to be a lower end offering. Oh dear. They are a little small, but the biggest issue is how tinny they sound. Where did my bottom end go?



Everglide S-500

Price **\$129** Supplier **Gamerzstuff**
Website **www.gamerzstuff.com.au**
Class **Closed** Microphone **Lapel**

A 'gamer' offering, the Everglide's big win is on the audio clarity. Deep backs give plenty of room for the sound to play on the ear. They are tweaked to emphasise important game frequencies, which translates to additional clarity in the heat of action. Comfortable and easy to adjust. The cable is happy to flow, and the lapel mic is completely separate.



Beyerdynamics DT440

Price **\$299** Supplier **Audio Telex**
Website **www.audiotelex.com.au**
Class **Open** Microphone **No**

Very nicely styled silver cans, and the quality of the audio is very good. The cups aren't very deep, but the open backs really add to the sense of space. The material covered cushions get a little itchy after an hour of wear, but a very short break seems to reset the comfort factor.



Beyerdynamics DT250

Price **\$299** Supplier **Audio Telex**
Website **www.audiotelex.com.au**
Class **Closed** Microphone **No**

Better fidelity than the DT440, with a really broad sense of space for easy stereo location. An interesting result considering the closed backs. Also a nicer material on the cushions it seems, so they stay comfortable longer. But the big issue is a fully coiled cable. They just don't run very well at all, so it gets strewn across the keyboard on its way to the headphone jack.



Beyerdynamics MMX1

Price **\$199** Supplier **Audio Telex**
Website www.audiotellex.com.au
Class **Closed** Microphone **Integrated**

The only USB set in the bunch, it is interesting how easy they are to set as the audio device. An integrated mic on an easy to adjust arm works a treat. Very light too, and comfort wasn't an issue, though not outstanding. Their interpretation of audio settings was off though, as they seem louder and bassier than the rest. Out of the box, they are a bit too muddy.



Beyerdynamics DT231PRO

Price **\$109** Supplier **Audio Telex**
Website www.audiotellex.com.au
Class **Closed** Microphone **No**

These look small out of the box, but fit very well and the cushioning is like a lush pillow. Sound results were more than acceptable, giving great clarity and stereo, if lacking a little on the spaciousness. Over time, they did apply a bit too much pressure. Slightly larger cans, or a smaller head, would have lifted these, but they are another great value choice.



AKG K55

Price **\$69** Supplier **Audio Products Group**
Website www.audioproducts.com.au
Class **Closed** Microphone **No**

AKG's knowledge trickles down the line. The fugliest of 'phones are also big and light, with good self-fitting, though it does need occasional help. A bit sweaty with cheap vinyl cushioning, but are a breeze for long tilts. Good space in the cans gives great sound stage for the price. Fidelity isn't as good as others, but it's ample for good gaming.



AKG K66

Price **\$89** Supplier **Audio Products Group**
Website www.audioproducts.com.au
Class **Open** Microphone **No**

Very similar to the K55, with the added open element giving added space to the overall experience. Take what we said for the K55, apply here, add a few more style points, better audio performance, and stir. If you have the extra \$20, go for it.



AKG K301XTRA

Price **\$199.95** Supplier **Audio Products Group**
Website www.audioproducts.com.au
Class **Semi-open** Microphone **No**

Nicer look than the other AKGs, and the self-fitting system is a little more exacting here, which keeps things comfortable for longer. Plus plenty of room in the cans for comfort and great audio spread. At the price though, it seems spending a little more or a little less will make you a happier gamer.



Sennheiser HD201

Price **\$49.95** Supplier **Syntec**
Website www.syntec.com.au
Class **Closed** Microphone **No**

Feel cheap, look cheap, and a flimsy cable to boot. They are stiff armed, tight on the head, and the adjustment system is too loose. Very average sound rounds out a very disappointing unit from a big name in audio. It should take a lesson from AKG.



Sennheiser HD555

Price **\$249.95** Supplier **Syntec**
 Website **www.syntec.com.au**
 Class **Open** Microphone **No**

Up the higher end of Sennheiser's range, things are more what we expect. The adjustment system is quite annoying, though, especially after all the nice self-fittings we've seen here. But the pads are deep and comfortable, with a very light feel. The depth translated to a great sense of space, and the fidelity was spot on.



Steelcase 5Hv2

Price **\$149** Supplier **Actiontec**
 Website **www.actiontec.com.au**
 Class **Semi-open** Microphone **Integrated**

Very nice styling! Sleek, black and bold, with very deep cups and a semi-open back that gives excellent sound reproduction. Built specifically for gaming, the sound stage, clarity and fidelity were all a dream, even at high volumes. A cloth coating on the cable helped them go where you wanted with ease. The integrated mic is amazing, disappearing into the cup when you don't need it.



Icemat Siberia

Price **\$99.95** Supplier **Actiontec**
 Website **www.actiontec.com.au**
 Class **Open** Microphone **Lapel**

Sexy gloss white finish and great styling in general give a promising start, but the big let down on the Siberia is clumsy cabling which just never seems to sit quite right. Tight on the ears, which only becomes uncomfortable with extended wear. The sound was great, though. Close, but no cigar.



Verdict

We've skinned a few cats in this roundup, not all of them pretty.

On the question of open versus closed back headphones, there is no definitive answer. We must tip the scales in favour of open and semi-open, although closed back models with deep interiors showed they are more than capable of creating exceptional audio environments.

Probably the most cut and dried answer here is to avoid overly small cups like Ebola. Every set that was that little bit smaller than the others had us ready to rip them off after the half-hour mark, and we needed to rest our ears afterward to be sure and give the next sets a fair chance. You want big, deep cans on your headphones for extended wear, and as mentioned above, the sound stage was always better when the headphones had deeper internal space. There are exceptions, but if you go and test-wear a few sets, make sure your ears have room to enjoy the scene.

Features like self-fit are more useful than they might sound, making it easy to get comfortable and right down to business. The less you feel the headphones on your skull, the better they serve the purpose of enjoying the game.

Another general point is cabling. These companies are in the business of cables to a certain degree, yet only a few really featured a cable that shared a level of quality with the headphones. All cables (except the coiled nasties) ran to a good length, but the cables natural capacity for shaking

off the folds and running smoothly out of the way was very often a nuisance.

For our podium finish, it is great to see some sub-\$100 sets that deliver great performance. Both the AKG K55 and K66 models are superb value, and the use of big, spacious cans has translated well to good stereo

performance. These are unbeatable for the money.

Just over the \$100 mark, the Beyer Dynamics DT231PRO was another winner. Having tested without knowing price points, these gave a vibe like some much more expensive sets, so a few nitpicks quickly subsided when we realised what good value they are – and they are a good option if you really want to go a little smaller.

One \$299 set showed you can spend big and get a lot for your money. The Audio Technica ATH-A900 was the most comfortable set of phones we tested, with audio that was just to die for. We went back and used these a lot more once the testing was done.

Yet it is the Steelcase 5Hv2 that prevails. When you put yourself out there as a 'gaming' set of phones, you

do see a bit more scrutiny. But the audio performance was on par with more expensive sets in all games, comfort factor was always a pleasure, and all minor details showed Steelcase knows the market well. All this and a mic that redefines what it is to be integrated. In what was otherwise a close race, the 5Hv2 storms out front to win the day.

You want big, deep cans on your headphones for extended wear, and the sound stage was always better when the headphones had deeper internal space.

World of Warcraft Shirts

Supplier PC Case Gear
Website www.pccasegear.com.au Price \$35

Whether you hang out in Stormwind or Orgrimmar, you know what side you're on. Proudly display your allegiance to both WoW and your declining chance of ever socialising again by grabbing these or a number of other WoW based shirts available at PC Case Gear.



i-rocks Slim Cordless KB/ Mouse

Supplier Anyware
Website www.anyware.com.au
Price \$199

If you feel the burning desire to be as close to a Mac as possible without actually buying any Apple products, then this cordless desktop offering from i-rocks will go a long way to emulating your fruit lusts.

You'll need two AA and two AAA batteries to power the keyboard and mouse respectively, and fortunately your first set is included.

Cybersnipas DogTags 512MB

Supplier Anyware
Website www.anyware.com.au
Price \$52.95

One has a 512MB USB key, the other an LED torch, phillips/flat head screwdriver and small set of pliers. If you're the tech guy at work and you want to prove that you're dedicated to the service in a big way, strap a couple of these suckers around your neck. And when you quit, you can rip them off and throw them on your boss' table before you walk for maximum impact. Ten hut!





◀ Flexiglow Lightspeed

Supplier Anyware
Website www.anyware.com.au
Price \$59.95

Another light up keyboard from Flexiglow, the master of all glowy blingy things. The usual media shortcut buttons are sprawled over the top of the board, and it has a surprisingly solid weight to it – enough to possibly knock unconscious anyone who dares to touch your PC at LANs. Some disturbingly squishy keys are hard to get used to. But it glows!

NU Dolphin Swimmer ▶ MP3 Player

Supplier Anyware
Website www.anyware.com.au Price \$189

The world is determined to have an MP3 player in every possible situation. Seriously, we'll have players designed especially for coffins soon. This little gizmo can survive underwater, being built especially for swimmers. At least it beats that 'glug, glug, glug' sound that usually accompanies being in the water.



◀ Double Dragon SATA & IDE > USB 2.0

Supplier Anyware Website www.anyware.com.au Price \$45

Not quite endorsed by Billy and Jimmy of 1980s classic arcade game, this Double Dragon means you can hook any SATA or IDE drive up to USB 2.0 – bloody genius! It even has a 'one touch backup' button that everyone seems to rave about these days. Still, we can't wait to use this thing to rescue the data off our hundreds of inactive hard drives strewn around the place.



ATEN 4 Port DVI ▶ KVMP Switch

Supplier Anyware
Website www.anyware.com.au
Price \$359

Yes! Finally a DVI switch available for the masses! And a heavy sucker it is too, including DVI/audio/USB cables for every connection. If you have a rack of machines and really want to cut down on TFTs, keyboards and rodents, you could do worse than going here. Shame about that 1600x1200 max resolution support though!



ASUS Extreme Striker

Craig Simms looks at an extreme pricer.

Price \$499 Street Price \$555
Supplier ASUS
Website www.asus.com.tw
Specifications Socket 775;
2x PCI-E x16; 2x PCI;
1x PCI-E x8; 2x PCI-E x1;
ADI1988B sound;
dual gigabit Ethernet.

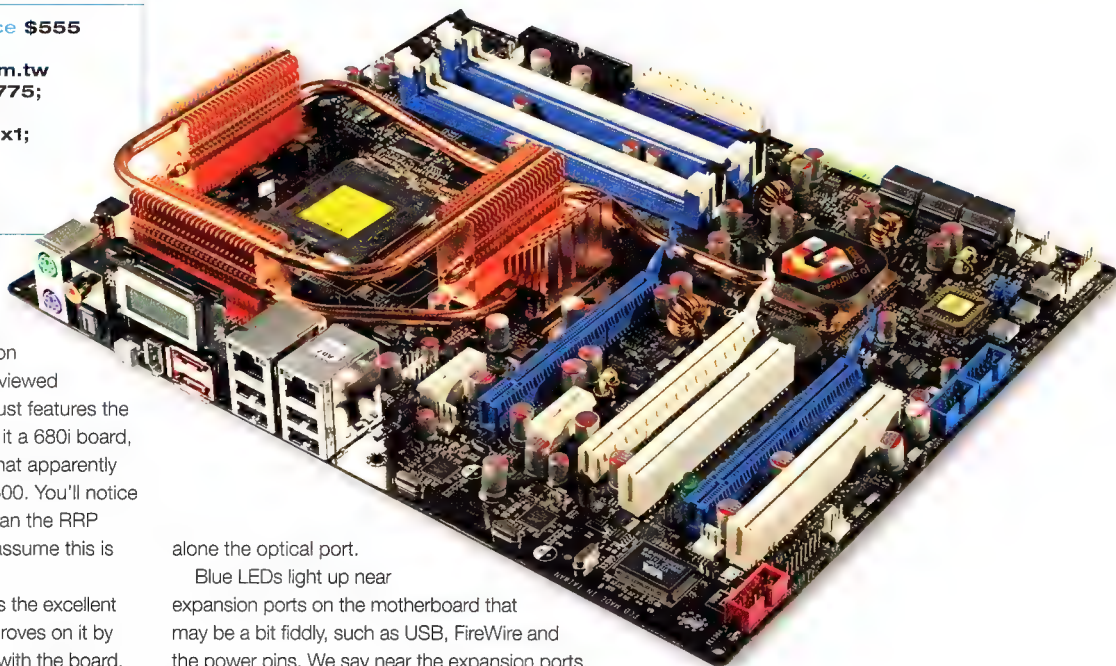
Apart from the elaborate maze of passive heatsinks, you'd be forgiven for thinking this is an upgraded version of the P5N32-SLI Premium we reviewed last month. In fact, it really is – it just features the new C55 northbridge that makes it a 680i board, and a few other choice baubles that apparently demand the ridiculous price of \$500. You'll notice the street price above is higher than the RRP we've been given – we can only assume this is due to early supply and demand.

The Striker starts well – it shares the excellent NVIDIA 680i reference design, improves on it by making all the SATA ports parallel with the board, adds a better cooling system, a more easily removable battery and a clear CMOS button on top of the already expected power and reset buttons. Foolishly the single IDE port is still wedged behind the main power connector, making routing of cables annoying at best. Solid capacitors dot the board, ensuring longer life and more stable power delivery.

alone the optical port.

Blue LEDs light up near expansion ports on the motherboard that may be a bit fiddly, such as USB, FireWire and the power pins. We say near the expansion ports, because they don't do a particularly good job of lighting the area, meaning you may as well be startlingly innovative and, gasp, turn on the room light instead to set up your system.

A similar idea is on the back panel, with a blue-lit digital readout. While the lighting is spurious in its effectiveness, the data displayed when POSTing is invaluable in terms of spotting



and otherwise the board maintains the usual slick ASUS build quality.

Unfortunately ASUS has opted to go with its own BIOS, which is nowhere near as intuitive or flexible as the default NVIDIA one. It's actually a pretty standard BIOS, it's just that we've grown so used to the great layout of the NVIDIA BIOS that most others now frustrate us.

Overclocking wise, we could hit a stable 3.575GHz with our X6800 – a good 125MHz less than its EVGA counterpart. Not exactly a huge difference, but considering the premium price you'd think it'd be able to at least match the reference NVIDIA board – an indication that lower clocked chips with higher ceilings may not overclock so well.

Ghost Recon: Advanced War Fighter and a Professional version of 3DMark06 are bundled in, yet despite the 'free' moniker we can't help but feel in some way this has contributed to the cost of the package.

The Striker is a good board by pure virtue of its 680i heritage – just far too expensive. While we appreciate the originality, ASUS needs to reassess its kitchen sink mentality when aiming at gamers, and NVIDIA needs to find a way to lower its high end motherboard costs – this is getting beyond the point of tolerance. If you need a 680i board, get the EVGA instead, or if you must go ASUS, wait for the considerably cheaper P5N32-E-SLI.

“Considering the premium price you'd think it'd be able to at least match the reference NVIDIA board.”

ASUS has broken the bog-ordinary ADI1988B audio chip onto a separate card again and branded it 'SupremeFX'. Don't believe the hype, it's still onboard sound. The coax S/PDIF is a nice touch although realistically most gamers – who the board is aimed at – will never touch it, let

problems, and is infinitely friendlier than past two digit displays, or the Series-Of-Random-Beeps(TM). Big thumbs up to the ASUS lab rats here.

A pair of dedicated eSATA ports sit on the back, rather than using NVIDIA's pass-through idea,

	EVGA nForce 680-SLI	ASUS Striker Extreme
Sandra Processor Arithmetic Dhrystone (MIPS)	27,100	27,159
Sandra Processor Arithmetic Whetstone (MFLOPS)	18,593	18,580
Sandra Memory Bandwidth INT (MB/s)	5571	5775
Sandra Memory Bandwidth FLOAT (MB/s)	5637	5774
3DMark06	5259	5266

SCORE **7.5** OUT OF 10

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Operation Lifetime

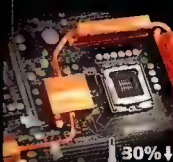
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GIGABYTE

Inwin F430

Craig Simms wants to start his big red engine. Broom broom!

INWIN F430

SPECIFICATION

Price **\$TBA** Street Price **N/A**
 Supplier **Inwin**
 Website **www.in-win.com**
 Specifications **Steel construction;**
makes car noises; 7x PCI slots;
120mm fan at rear; 3x HDD bays;
2x FDD; 4x ODD.

Inwin is an old name in cases – it's been doing this for quite a long time, although mostly in the server/beige box space. It has been experimenting with a few diversions of late though, and when a Ferrari red desktop chassis with an impeccable finish turned up on our doorstep, we couldn't help but take a look.

It's clear that the case is meant to be Ferrari inspired, however there's no official endorsement. We're guessing Inwin tried to get the Ferrari name and didn't succeed, and hence settled for taking the same brand name as the Ferrari's bloody nice F430. Sneaky.

There is a definite race car theme going on here – apart from the red, the power on button has the words 'START ENGINE' emblazoned on it. Oh, and it makes a noise like a car revving and then burning off when you press the button, in complete noise-clipped low quality sample glory. Sadly it sounds like an overblown Hyundai Excel, but it's the thought that counts. There's also a volume wheel hidden under the front if you dare to stick your hand far enough into the grill, although most will simply disconnect the molex connector that powers the speaker when their inner V8 supercar driver finally screams to shut it the hell up.

Starting from the outside, the finish is a very professional, deep polished red, approaching automotive paint quality. One side panel has a raised area, which has airflow exit points through the silver grill in the middle and through the sides

of the raised area itself. Presumably this is in an attempt to reduce and disperse the amount of direct noise caused by the air flow and the PC interior. On the other side of the panel is a height and position adjustable tube, to direct hot air from the CPU directly to the outside. It is also fully removable should you have a behemoth heatsink installed and need the extra height – always a welcome option.

The quick release clamps that hold the sides in place are far too weak for their job, so we advise purchasing some thumbscrews along with the case should you decide it's for you.

The interior is rolled steel, although Inwin has done remarkably well to keep it light and portable. In a departure from other manufacturers, the brackets that cover the slots at the back of the case do not come pre-installed, saving the old fingers from the usual slashes from case or screw driver while trying to get them out.

Two sets of 5.25" and 3.5" slide install brackets have also been included, but this doesn't cover the extra two 5.25" and three 3.5" bays. Not that you'd want them



as installation is a bit of a pain, requiring you to remove the case face to install, and the rails themselves are not particularly finger friendly either.

Further to this the 3.5" rails only fit floppy drives – hard drives have to be screwed in. This denies the user two extra storage bays for hard drives, as the two external 3.5" bays can only be used with this slide system, and not screws. A large area between the floppy and hard drive bays is set aside for cable management, with plastic loops included to assist this, although we can't help but feel we'd rather two more drive bays in there.

A 120mm fan at the back is the only air flow source, and on the right hand side of the front is the usual smattering of USB, FireWire, headphone and microphone ports.

Despite the great start with the exterior, the interior unfortunately reveals Inwin's F430 to be nothing more than a Ferrari body kit bolted on to an old school Lada.

SCORE

6.0
OUT OF 10

Antec 900 Advanced Gaming Case

Nathan Davis sacrifices a few kittens to the case God.

SPECIFICATIONS

Price \$225

Supplier Altech

Website www.altech.com.au

Specifications Black steel; ATX; tower case; 3x external 5.25" bays; 6x internal 3.5" bays; 200mm 800rpm exhaust; 3x 120mm 2000rpm fans; base PSU install area; top IO access (FireWire, USB 2.0, audio).

At the sight of this case, several expletives were declared. We won't go into details, suffice it to say many baby kittens were reduced to shivering wrecks in a horribly cruel and lambasting manner.

This has something to do with the 200mm exhaust fan that hangs from the case's roof like a waiting tiger. Scrub that – it's more akin to a T-Rex looking to actively destroy its surroundings to get to its delicious victim.

This fan of massive proportions would scream and roar on its own free will, but that is not something that needs to be focused on. It takes care of that when flicked on, as it's definitely audible at high speed, even though that's merely 800rpm. To combat it, it has a three-position switch for speed control – high, medium, and low, like all the included fans – but this closely juts out over the blades.

The location of this switch originally put the fear of your favourite random deity in us, but it turns out it's actually quite safe. It sports a teeth-gnashing dinosaur mouth, but it won't rob you of blood, even when it's force-fed human bits. We tried, just for kicks.

Sufficed to say, the case is effective at moving fresh air around. With the power supply positioned at the base, relocating the rising heat grows even more important, especially considering the CPU sits near the top of the case.

This would explain why there is also a 2000rpm 120mm fan attached at the rear-top of the case, just to be sure the CPU area receives more than

simply heated air.

The last two fans are the intakes on the front. They're of the same specs, only transparent and embedded with blue LEDs. We don't know about you, but we're over the blue LED thing.

Unfortunately these LEDs can't be turned off without popping out the molex cable or grabbing the Dremel, so if you're one to leave your system running overnight, the colour to which your eyes are most sensitive will be demanding your attention.

With all the supplied fans set to 10 – each rated at 30dBA – the noise is *noticeable*.

Luckily at medium it sharply drops off to a much softer whimper, while still moving decent wads of air.

The two bays that each fit three 3.5" drives slide out the front for easier access. But not before unscrewing four thumbscrews – on both sides, no less. What is this, 1995? According to the manual, the case also comes with a 5.25"-to-3.5" external bay cover for, say, a floppy drive, but our sample forgot to include that. The three 5.25" bays are of just your regular, archaic screw-in type.

Quite simply, this case isn't very special – and lacking a power supply, the price seems a tad obscene. All it



does is locate your supplied PSU at the base for some reason. It doesn't feature a removable mobo tray, nor screw-less expansion slots or drive bays, nor does it have a lid for what we can only assume is a peanut holder on its top.

Speaking of its top, that's where the power and reset buttons are located, as are the two USB ports, FireWire port, and headset ports. We don't know why manufacturers do this, but the reset button requires a nigh on pencil-sharpened finger – or our designer Bill's midget digits. We do know that it's annoying, because it gives Bill a chance to gloat about his damn Mac.

The Antec 900 is a suitable case for most purposes. We have no big complaints about it, but neither does it feature any of the regular luxuries we've come to expect from modern cases.

Not shabby but in no way is it an 'Advanced Gaming Case'.

SCORE **7.0** OUT OF 10

Gigabyte GA-965P-DS3

Craig Simms loves a good overclock in the morning. With eggs.



SPECIFICATION

Price **\$TBC** Street Price **\$209**
 Supplier **Gigabyte**
 Website **www.gigabyte.com.tw**
 Specifications **Socket 775; 965 chipset; 1x PCI-E x16; 3x PCI; 3x PCI-E x1; 6x SATA; 1x IDE; 1x FDD; Realtek ALC883 sound.**

The moment we heard this thing was a righteous overclocker for its price, we added it to the review list – and fortunately it didn't disappoint.

Although the target market is more mainstream – single PCI-E x16 slot, parallel and serial ports included – with only a little bit of fiddling we had our X6800 running at 3.63GHz stable – none too shabby, and only a little shy of our EVGA 680i 3.7GHz overclock. A warning here: the bottom of the board generates a lot of heat when overclocked, so hopefully your case is well ventilated.

Three PCI and three PCI-E x1 slots fill up the add-in board quota, although of course you'll lose one PCI-E x1 if you insert a double-slot video card.

Vexingly, in the board's only annoying layout problem you'll also lose access to the clear CMOS jumper pins if you possess said dual-slot card. The IDE port located at the bottom of the board may also cause some issues in terms of cable routing and ease of access.

Solid capacitors are littered all over the board, outlining Gigabyte's commitment to high quality parts. Two standalone passive sinks cool the chipsets.

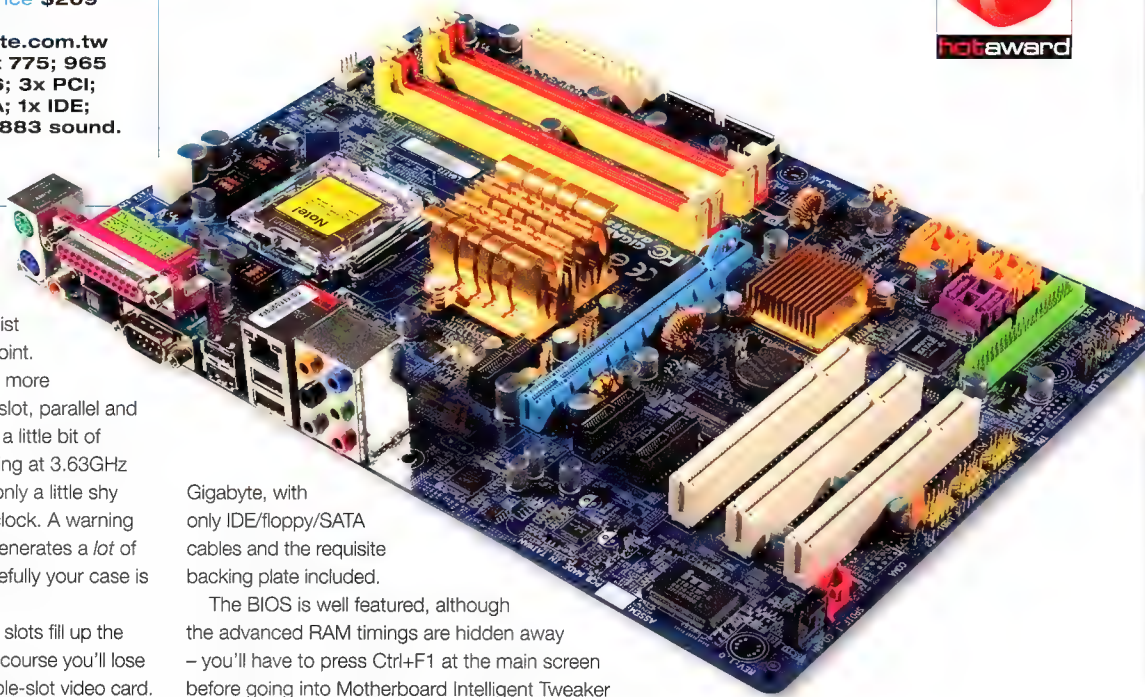
Accessories are actually quite sparse, especially considering what is usually bundled in from

Gigabyte, with only IDE/floppy/SATA cables and the requisite backing plate included.

The BIOS is well featured, although the advanced RAM timings are hidden away – you'll have to press Ctrl+F1 at the main screen before going into Motherboard Intelligent Tweaker to do your overclocking thang. It's not as nice as NVIDIA's 680i BIOS, but then nothing is, save DFI's efforts.

While the inbuilt BIOS flashing utility 'Q-Flash' is a good addition, its ability to only read from floppy drive is a severe oversight. We long for the day when we can flash from a USB stick from within the BIOS.

Sound is provided by the Realtek ALC883 chip, with optical and coax outputs included. Marvell supplies the gigabit Ethernet duties with its 88E8053 controller hitting the PCI-E bus.



Four USB ports sit at the back, with six more available if you have the hardware to hook up to the relevant headers. Six SATA, one IDE and one floppy cable are featured on the board for your storage whims. The two purple ports are powered by Gigabyte's re-branded JMicron controller, and offer RAID 0, 1 and JBOD. The same controller also manages the IDE port, which might explain its odd placement. The rest are of course handled by ICH8, but unfortunately there is no RAID offered here as it is not the –R version of the southbridge.

Using an X6800, 2GB of Corsair PC2-6400 and our Albatron 7900GT we ran it through our usual benchmarks, and surprise, surprise, most things ended up the same as they've been with other Core 2 boards – but as mentioned above, this thing has overclocking legs of steel. Or silicon. Or something.

If you're on a budget and you still want to go Core 2, you really can't go wrong with this board. Paired with an E6400 you'll probably get the single best value you can possibly get out of components today.

With a solid dedication to build quality and sublime performance, unless you need the extra PCI-E slot and features, then this is the board for you.

“Paired with an E6400 you'll probably get the single best value you can possibly get out of components today.”

	EVGA nForce 680i SLI	Gigabyte GA-965P-DS3
Sandra Processor Arithmetic Dhrystone (MIPS)	27,100	27,053
Sandra Processor Arithmetic Whetstone (MFLOPS)	18,593	18,456
Sandra Memory Bandwidth INT (MB/s)	5571	5547
Sandra Memory Bandwidth FLOAT (MB/s)	5637	5599
3DMark06	5259	5249

SCORE **9.0** OUT OF 10

MSI P965 Platinum

Craig Simms wanted to go platinum with this board. But not really.

SPECIFICATIONS

Price \$229 Street Price \$191

Supplier MSI

Website www.msi.com.tw

Specifications 1x PCI-E x16;

1x PCI-E x8; 2x PCI; 2x PCI-E x1;

Realtek ALC883 sound; Realtek

RTL8111B network controller

(gigabit Ethernet); parallel

port; serial port;

FireWire 400.

It's fair to say that the 965 series has firmly entrenched itself in the minds and hearts of the Core 2 wielding folk of the world. While those who want SLI or a slight bit more of an overclock are jumping all over the 680i, the 965P still represents stellar performance at very good value.

MSI's entry to the 965 series is aimed more at the budget-end, despite the Platinum moniker. This is evident through its lacklustre overclocking, unable to push our X6800 stably any further than 3.287GHz – a good 523MHz less than the EVGA 680i, and almost the same distance from Gigabyte's GA-965P-DQ6. It did manage to boot into Windows at 3.5GHz, but Stress Prime 2004 went down in a burning, screaming heap of red warning dialogues three seconds into the test. Still, it's vastly cheaper than the aforementioned boards, so we weren't expecting a huge overclock in the first place. Nonetheless the array of decent overclocking options in the BIOS had us hoping.

The budget aspect is reinforced by the presence of parallel (Die! Die parallel, die! With a falafel in your hand!) and serial (Die! If engineers want to program through ancient technology, give them ancient boards!) ports, and a single gigabit network adaptor (Die! Oh no wait... we want that one. Still, a second would be nice). Onboard sound is still there of course, with both coax and digital S/PDIF.

There's a total of 10 USB ports supported (four on the back, two extra on a supplied backing plate and the rest available through motherboard header), with one 6-pin FireWire 400 port on the back – and another 6-pin and 4-pin supplied on a secondary bracket. Unfortunately you'll have to choose which one you want, as although there are two leads to hook up, there's only one header on the motherboard.

Seven SATA ports, one IDE port and one floppy connector do storage duties (courtesy of ICH8 and the JMicron JMB361 controller), and the usual four memory slots are there. MSI has once again coloured them oddly – while most manufacturers colour the slots to identify which ones should be used for dual channel, in an MSI board for dual channel you need to stick your RAM in different coloured slots.

In a method akin to the Americans spending thousands of dollars on a pen that works in

go fishing around in the depths of your case to find the release clasp – you can just yank your graphics card right out.

The board is passively cooled, with no fans or heatpipes in sight – just two small heatsinks that get moderately hot over time.

A decent recovery system is in place should

“Stress Prime 2004 went down in a burning, screaming heap of red warning dialogues three seconds into the test.”

space, and the Russians just using pencils, there's a complete lack of PCI-E retention clips, MSI opting to rely on the pressure of two plastic extensions instead – which is simple, and works absolutely fine. It also means you don't have to

you push your board too far in the overclocking stakes, although the BIOS will humorously tell you that it doesn't support 266MHz processors the moment you boot above stock speeds.

MSI's top of the range 965 offering is not so much a Platinum as it is a Silver. Still it does the job, and if you're looking to save money and don't care about overclocking it'll do quite well as the bed for your budget/mainstream system.

	EVGA nForce 680i SLI	MSI P965 Platinum
Sandra Processor Arithmetic Dhrystone (MIPS)	27,100	26,868
Sandra Processor Arithmetic Whetstone (MFLOPS)	18,593	18,308
Sandra Memory Bandwidth INT (MB/s)	5571	5534
Sandra Memory Bandwidth FLOAT (MB/s)	5637	5534
3DMark06	5259	5274

SCORE **7.5** OUT OF 10

MSI 7900GTO

MSI 7900GTO

SPECS

Price **\$TBA** Street Price **\$502**
 Supplier **MSI**
 Website **www.msi.com.tw**
 Specifications **650MHz core;**
660MHz memory; 512MB GDDR3;
double slot cooler.

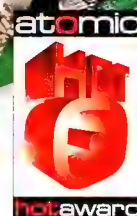
The 7900GTO is a familiar beast. Familiar, yet slightly odd. You see, it's an ordinary 7900GTX, double slot cooler and all, with its memory clocked down from 800MHz to 660MHz – the core staying at the relatively feisty 650MHz. At first you'd be forgiven for thinking: 'Why bother?'

Also odd is that MSI seems to be the only one in the country actually peddling the thing – but this is a good thing for it, as you'll soon find out.

The appeal all comes down to two very easy to grip facts. Firstly, the GTO is about \$70 to \$100 cheaper than the GTX. Check. Secondly, the memory overlocks just fine to 800MHz – meaning you get a GTX for less money. Bargain!

If you're particularly adventurous you could even go BIOS hacking to up the speed permanently – although we (and no doubt MSI) won't be held responsible if you brick your card. Best stick with nTune.

At standard clocks in 3DMark06 SM3.0,



Half-Life 2 and Call of Duty 2 at 1280x1024, it pulled 2334 3DMarks, 106.06fps and 43.90fps respectively. Bumping the resolution up to 1600x1200 reduced this to 1884, 84.00 and 34.42, while pushing to the 16:10 resolution of 1920x1200 saw 1600, 77.23 and 29.802 – still an admirable set of scores despite the crazy top resolution of our resident Dell 2405FPW.

We wish there was something more to say about this card, but considering how well known

the GTX already is, we'll just stick to what we've already said. GTX clocked slower, but can go faster. Its only weakness is that it's a DX 9 card in a soon to be completely DX 10 world – but considering that shift will probably take a year to be realised, it's not the worst investment someone could make to tide them over until it becomes mainstream.

In short: Is GTO. Is good.



SCORE
9.0
 OUT OF 10

Apacer WCG Edition PC2-8500

APACER PC2-8500

SPECS

Price **\$489** Street Price **N/A**
 Supplier **Blue Chip IT**
 Website **www.bluechipit.com.au**
 Specifications **2x 512MB (2x 1024MB available); 5-5-5-15**
PC2-8500 @ 2.2V; giant green
heat spreader.

Excluding Corsair's Dominator, these Apacer sticks have the most expansive heatsink we've seen. It also marks the first time we've seen modules decked out in reflective forest green, if that's the sort of thing that floats our boat.

The ASUS Extreme Striker mobo didn't seem to like this set of sticks running at 1066MHz, so out came the MSI 965P Platinum, which quite happily hit the requisite frequency at 5-5-5-15, giving us 5522MB/s and 5577MB/s in Sandra's Memory Bandwidth tests, INT and FLOAT respectively.

Unfortunately despite the name, the sticks didn't want to go much past their native speed, unable to hit the 1100MHz mark regardless of the voltage. We were able to drop the CAS down to four, which gave us a stable result of 5710MB/s and 5660MB/s.

Determined to squeeze out more we dropped the default speed back to 800MHz, dropped the multiplier on the CPU and pumped up



the FSB to see where the sticks could go. Although we were able to hit higher speeds, with stability in mind we could only reach 900MHz at 5-4-4-15. Any higher and Stress Prime 2004 started having errors.

Although the Apacer is called Overclocking RAM, it doesn't seem to have much of a ceiling – still, it hits its advertised values, and so we can't punish it too much. If you like your

forest green heatsinks then you can't go too badly – although we'd advise you pass on your chlorophyll-filled instincts and go Corsair or OCZ.



SCORE
8.0
 OUT OF 10



MSI

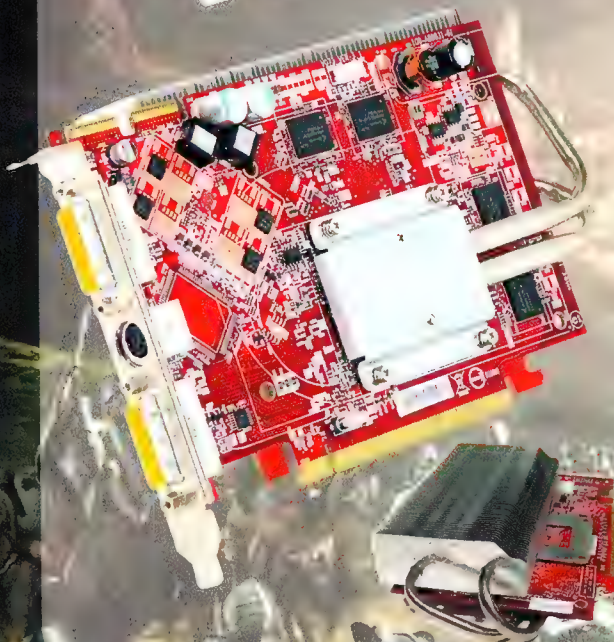
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RX1950PRO-VT2D512E

"...the MSI bundle is one of the most comprehensive (and inexpensive) on the market." (APC, Jan 2007)



RX1650XT-T2D256EZ

"This MSI version of the Radeon X1650XT is quite possibly the best version out there and we have seen just about all of them." (Legion Hardware, 5/12/2006)

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www.msicomputer.com.au

LG GBW-H10N

SPECS

Price **\$1199** Street Price **\$999**
 Supplier **LG**
 Website **www.lg.com.au**
 Specifications **Write: BD-R 4x, BD-RE 2x, DVD+R 12x, DVD+DL 4x, DVD-RW 6x, DVD+RW 8x, DVD-RAM 5x, CD-R 8x, CD-RW 10x.**

Sony's push of Blu-ray has been a costly one – you only have to look at the PS3 to verify that. And yet still HD-DVD persists, helped no doubt by Microsoft's alliance to the format. Still, it looks like Blu-ray is slowly winning, at least in the exposure rate. One only has to look at Sony's atrocious trojaning of its player into the latest Bond movie to see that. Or the PS3, naturally. Or the fact that they can force support through its owned studios of Columbia, TriStar and MGM.

On to the drive at hand – a fairly nondescript, although logo heavy unit that handles pretty much every format under the sun. Despite being faster than Sony's BWU-100A with BD-R, LG's unit doesn't handle dual-layer BDs. Considering the take-off of dual-layer DVDs has been less than spectacular and Blu-ray has yet to prove itself, this isn't exactly the show stopper it may at first appear to be. Perhaps more of a problem is the slow CD-R writing speed, and the surprisingly persistent EIDE interface. Can someone kill this already?

In its favour it does support bitsetting, allowing DVD+RWs to be set to the DVD-ROM book type for greater compatibility with some standalone or less DVD-friendly devices.

Updating from firmware GL02 to GL04, we used a TDK 2x 25GB BD-RE disc, a Verbatim 8x DVD-R single layer disc, ImgBurn and DVDInfoPro for testing. Unfortunately we did not have a 4x BD-R disc on hand to test the write quality at top speed.

The BD-RE produced a clean 2x write in 44 minutes 48 seconds, at eight percent CPU utilisation – considerably better than

the Sony alternative. DVD writing also showed no issue, hitting the rated 8x with no trouble.

If you have to buy Blu-ray right now, the LG is a good choice, or at least a better one than the Sony – however the low CD burning speed, EIDE interface, price and lack of dual-layer support tells us it'd be prudent to wait a little longer. **CS**

SCORE **7.5** OUT OF 10



Optoma Movie Time Projector

SPECS

Price **\$1999**
 Supplier **Milestone Solutions**
 Website **www.milestone.com.au**
 Specifications **Inbuilt DVD player; 1000 ANSI lumens; 4000:1 contrast ratio; DLP chip; 3 year warranty; 854x480 native resolution.**

So, you want a monster display, but your family or flat mates can't handle a more complex home theatre setup. Your saviour: this all-in-one DVD player and projector. They won't be able to resist, especially when you let them know how awesome Gears of War would be on the wall.

It's designed to be used on a coffee table, so the beam is projected at a very steep angle through a very short throw lens. Stack a few pizza boxes in front of it and the picture won't be obstructed.

Despite the 1000-lumen bulb, the image was still bright and viewable at the maximum 120 inches in a dimly lit room. Thank the 4000:1 contrast ratio for that one, but be aware that many of the colour settings tend to scale towards superwhite, making the rainbow effect of the DLP chip more noticeable. This has been done to make it easier to view on walls instead of screens, because when you pull the contrast levels back this snag disappears. We did just that, and except for the relatively low resolution image looking a tad pixelated at full zoom, image quality was excellent.

You get composite, S-Video and VGA inputs, as well as a VGA to component converter. The DLP chip has a resolution of 854x480 – a native 16:9 aspect ratio. Although that's lower than HDTV and almost all PC resolutions, VGA resolutions up to 1280x1024 can be displayed after they're scaled back.

You'll have to juggle some connectors to switch between multiple audio sources, because there's only a single pair of RCA inputs. There are two outputs though, one analogue 3.5mm connector and one optical output.

It's all nice and self-contained, but like all projectors, the internal speakers are a tinny, scratchy abomination. If you're not using the DVD



player's optical output, you won't be able to mute them without killing the 3.5mm audio output.

At less than \$2000, and with the audio being the only real (but easily fixed) problem, it's a bargain. Now, if only they'd named it after a transformer... **DF**

SCORE **9.0** OUT OF 10



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Thermaltake Lanbox VF1000BWS

SPECS

Price \$209
Supplier Mwave
Website www.mwave.com.au
Specifications Black steel; micro-Removable mobo tray; 2x 5.25-inch; 3x 3.5-inch; 2x 60mm 1800rpm; 1x 90mm 1500rpm; chunky handle.

Thermaltake is the commander of all that is Platinium, but it has seemingly moved up a level in the pseudo-table of elements, at least both in and for this case.

We'll call this new *Atomic*-ordained element 'Steelasticum', as both the case covers and framework primarily consist of a steel origin, featuring an aluminium front punched out with USB, FireWire, and headphone jacks. It's also fused with a healthy dose of plastic, including two Perspex windows, a 90mm intake and two 60mm exhaust fans.

The designers definitely understood certain aspects of the LAN party, as seven thumbscrews are used to hold the motherboard tray in place. That's bound to discourage the damn prying fingers.

Once unscrewed, the micro-ATX mobo tray slips out entirely, making way for installation of the power supply, with front-accessible 3.5-inch and 5.25-inch drive bays, of which there are one and two, respectively.

Under those drive bays, there is a removable cage that houses an additional two 3.5-inch drives. It also has a gaping vent in each window and big grating above the PSU. So, ventilation isn't a problem, but dust will be.

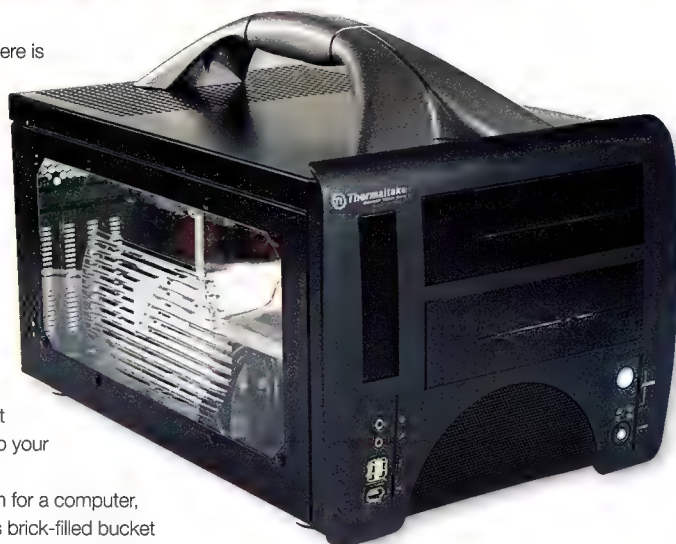
Up to this point, it's a fairly useful LAN case. The inherent problem with this cocoon, however, is it needs to be fairly collapse-resistant while being lugged around. At 7.5kg, it's heavy enough to rip your spine out. Or thereabouts.

This wouldn't be a problem for a computer, ordinarily, but considering this brick-filled bucket was made for easier carting of your computer to LAN parties, this more than bugs us.

According to its website (www.ttlanbox.com), this case is 'your ultimate weapon for the cyber world.' (Seriously, check out the site's intro - it's both amusing and screwy).

It's a weapon, that's for sure. It's the sort of thing you'd find in Wile E. Coyote's deadly weapon stash.

If you've 'got chub' and don't mind the thought



of a work-out when porting your system around, this'll likely melt away the excess. Who says gaming can't give ripples of muscle?



SCORE 7.5
OUT OF 10

ASUS DRW-1612BL LightScribe

SPECS

Price \$79
Supplier ASUS
Website www.asus.com.tw
Specifications LightScribe; 2MB cache; 16x DVD±R/8x DVD+RW/6x DVD-RW/8x DVD±R (DL); 48x CD-R/32x CD-RW; 16x DVD-ROM

This burner can write, with its laser (don't be unsurprised so soon) on top of CD media. Called LightScribe, this technology from HP imposes imagery of your choice on top of the media.

Of course, this magic doesn't come free, as you need to purchase super-special optical media (two samples are included) coated with the 780nm-infrared reactive dye. It'd be a wee more ingenious if this could write on standard discs, but this is a tad improbable given the need for some kind of ink.

Taking almost 14 slow minutes to burn a best-quality image, the end result basically looks like an overly-loved vinyl record that was sent through a fax machine.

LightScribe's intention is interesting, but for now it's still just a ridiculous novelty that doesn't really work. If such a gimmick is slick enough for you, pig out.

Sporting 2MB of cache, this isn't something that makes one get nekkid and run around screaming, but most half-modern systems are capable of supplying

a drive with the necessary data. Sit that alongside the usual buffer protection, and the small cache becomes boringly moot.

It's a PATA drive, but you'll need to supply your own IDE cable as one is not included. This is odd, because we're used to collecting those things in the labs. Maybe they're onto us.

Writing with the drive is a pleasant experience, as it diverges from the norm by not attempting to imitate a freaking learjet. Quite the opposite.

It does come with an OEM copy of the aging Nero 6 (v6.6.1.6f), but considering Nero 7's fanciful focus on a digital lifestyle rather than just the damn burning application, perhaps this is a

good thing. It's the incinerable Express version, though.

The slightly steep price aside, for practical purposes, it's a reasonable drive that features adequately feisty speeds and is surprisingly quiet in high-speed operation. It'll also let you experiment with LightScribe, because you secretly know you want to, even though it really does suck.

Yes, goatse fits quite well.



SCORE 7.0
OUT OF 10





LAN BOX

mini

CHASSIS

on

THE MOVE



VF1000SWA
Silver Lanbox



VF1000BWS
Black Lanbox

*Screen is optional

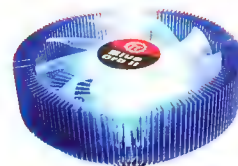
Optional extras to compliment your Lanbox:



A2413
7" LCD auto retractable
touch screen monitor



W0131
850W Tough Power PSU with
modularised cable management



CL-P0257
Blue Orb II super silent
universal CPU cooler



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Tagan TurboJet TG1 100-U95

TAGAN TURBOJET

Price \$484
Supplier EYO
Website www.eyo.com.au
Specifications 1100W; 2x 80mm fans; 4x 12V rails; 24-/20-pin ATX; 10x SATA; 3x molex; 4x PCI-E; 2x floppy and 4x molex adaptors.

Short of tossing a nuclear power station into your juice-guzzling boxes, this power supply ought to keep the electricity bills sky-high. Not that we condone the tossing of nuclear reactors, mind you.

It arrives in a small briefcase, which is useful for those times you need to cart around just the PSU.

Chugging out a disgustingly erotic 1100 watts, this unit would probably like to power two quad-core (CPU and GPU) systems. But it can only manage one such system, with a single 24-pin ATX connector (backwards compatible with 20-pin).

Sure, it'll rip your head clean off if you rudely stare at its monstrous torrent of cabling, but with 10 SATA, three Molex, and four PCI Express power connectors all permanently hanging out the back, it packs less features than the average set of steak knives.

Its creators aren't idealistic, though, as four SATA-to-molex adaptors have been supplied, along with a molex-to-floppy. An adequate move for an otherwise no-nonsense PSU.

For the price, we have to ask why the lack of

useful nonsense, such as a modular cable system and a bar fridge. Luckily it overcomes part of the cable issue, as it includes some Velcro strips which seek to control the tangle.

That said, if you're looking to create the ultimate 10-SATA-drive file-server and quad-core game machine, in one, this well-hydrated juice box will do nicely. You're bat-shit insane, but we want your spawn.

In terms of noise, we expected it to go all Steve Ballmer on our arses. Although this isn't its strong point, with an audible whir, it throws less chairs.

If you stick your ear up to the 80mm intake fan, oddly enough, it sounds like a bubbling fish tank. But that could well have been blood gushing out the slightly quieter 80mm exhaust fan on the opposite side. It's rather hard to tell.



If expensive is your thing and features mean zip, you'll probably want 10 to power your 11 kilowatt Beowulf cluster. And we expect to see that in Hotbox.

ND

SCORE 8.0 OUT OF 10

ASUS X1650XT

ASUS X1650XT

Price \$279, \$299 for CF Edition
Street Price \$284
Supplier ASUS
Website www.asus.com.tw
Specifications 575MHz core; 1350MHz 128-bit GDDR3 memory; 24 pixel units; 8 vertex units

It's finally happened: ATI has a 7600GT competitor. It may be on the eve of DX 9's inevitable retirement, but it has done it in the form of the X1650XT.

Although the other X1650XTs we've seen require no power, ASUS' model comes with a power socket and features an obviously different board design to its competitors.

The card also features the new Native CrossFire, as seen previously on the X1950 Pro – here is where the debacle begins. Although there no longer exists a physical need for CrossFire edition cards (as the compositing engine is now on all cards), a number of vendors aren't including the required internal bridges to enable CrossFire, in an effort to save on costs. According to ATI, vendors should be including one bridge with every card (two are required for CrossFire to function). The reality is the bulk of cards are currently being sold without bridges, with CrossFire editions still needing to be bought to attain the required bridges at a slight extra cost. This will apparently be

changing soon to fit ATI's way of doing things.

ASUS manages to make a good stab at value, including a CD wallet, DVI/D-Sub converters, component breakout cable and molex to PCI-E power cable. GTI Racing is included – not exactly a show-stopping game, but entertaining enough.

In 3DMark06 SM3.0, Quake 4 and Half-Life 2 the card scored 1262 3DMarks, 47.9fps and 56.49fps respectively. Comparatively, the 7600GT pulls 1099, 47.8 and 50.65. Victory for the red team!



The X1650XT does cost a little bit more than the now ancient 7600GT, but still represents decent value. If you're looking for mid-level DX 9 card, then this is the ticket. In saying this, we'd suggest stretching another \$50 to \$80 and going for an X1950 Pro or 7950GT for better cost/performance, or more sensibly waiting for the budget DX 10 parts to be released in the first half of this year.

CS

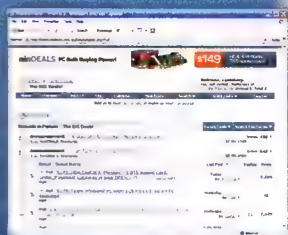
SCORE 8.5 OUT OF 10

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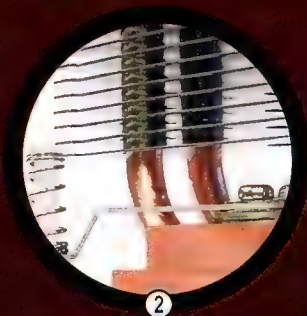
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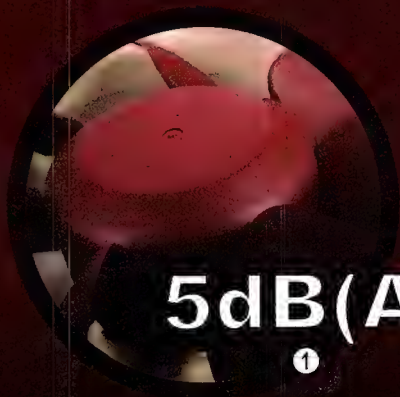
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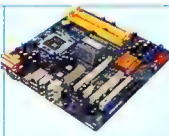
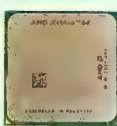
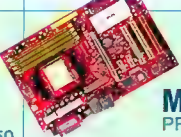
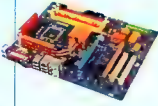
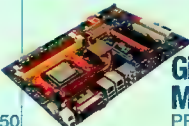
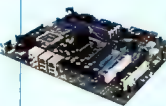
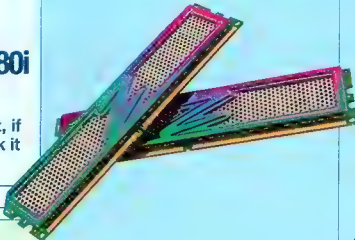
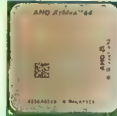
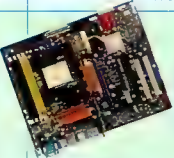
TLOG

Our choice for the best gear the land has to offer

There's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and

a collection of sports cars (Extreme), we're here to help with this handy matrix of Atomic recommended products. You may find your needs fall between categories – that's okay,

just mix and match to suit your budget! Each piece of kit has been reviewed hands-on in Atomic, so if you want to learn more, look up the issue and page number listed.

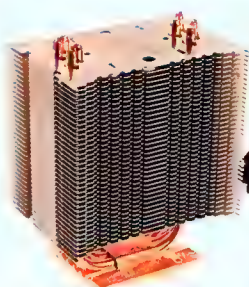
		CPU's	Motherboard	Memory	Video card
BUDGET <i>I can't afford to eat... gimme gear!</i>	intel	 Intel Core 2 Duo PRICE \$300-\$830 Stretch a little further and buy yourself a Core 2 Duo – you'll be thanking yourself later. The E6300 is the cheap ticket to speed, at \$300.	 ASRock Conroe 945G-DVI PRICE \$120 ASRock's budget board may be using old technology, but it runs the new stuff just fine, and can even overclock a little. <i>Reviewed in Issue 70 – Page 60</i>		
	AMD	 AMD Athlon 64 AM2 X2 PRICE \$250-\$650 Cheap CPUs are a wonderful thing, and the X2s are now wonderfully cheap. The 3600+ is your budget baby at about \$230.	 MSI K9N Neo PRICE \$105 Excellent performance from a budget board, with plenty of legacy slots for upgraders. Don't expect to overclock though. <i>Reviewed in Issue 68 – Page 33</i>	Corsair Twin2X 1024MB 6400 Pro PRICE \$245 Corsair has a history of providing nice, stable and feisty sticks of random access memory joy. These RAM sticks are EPP compliant, have low latency and are nicely overclockable. 800MHz of fun for everyone! <i>Reviewed in Issue 69 – Page 51</i>	Powercolor X1950 Pro PRICE \$295 The X1950 Pro is nothing short of fantastic. Mind you, this could just as easily be the 7950GT, so watch this space in case the NVIDIA card drops in price. <i>Reviewed in Issue 71 – Page 47</i>
PERFORMANCE <i>Hardware that bangs the best for buck.</i>	intel	 Intel Core 2 Duo PRICE \$300-\$830 Core 2 Duo – crazily fast, crazily cool, crazily affordable, overclockable like buggery. The E6400 is the best buy, at about \$400.	 Gigabyte GA-965P-DQ6 PRICE \$350 The 965P is a great platform, and Gigabyte delivers with panache and flair. <i>Reviewed in Issue 70 – Page 54</i>		
	AMD	 AMD Athlon 64 AM2 X2 PRICE \$250-\$650 The X2 series are still fantastic chips, and in the face of the Intel threat are now going for cheap. The 4600+ is your current sweet spot at about \$400.	 Gigabyte GA-M59SLI-S5 PRICE \$256 Gigabyte delivers yet another affordable, feature-filled wonder of the 21st century. <i>Reviewed in Issue 66 – Page 39</i>	Corsair Twin2X 2048MB 6400 Pro PRICE \$437 Yes, these are the same sticks recommended for the Budget system. Sadly, they are also the only RAM sticks we've tested that are compatible with AM2 and Conroe. So until we get more in, the Corsairs will stay. <i>Reviewed in Issue 69 – Page 51</i>	GeForce 8800GTS PRICE \$675 DirectX 10 for the mainstream. It's a bit of a stretch financially, but will keep you happy for years to come. Fingers crossed for further price drops soon. <i>Reviewed in Issue 72 – Page 30</i>
EXTREME <i>Gimme power. Money is no object.</i>	intel	 Intel Core 2 Quad QX6700 PRICE \$1500 It may be clocked slightly slower than the X6800, but it overclocks fine and has double the cores! <i>Reviewed in Issue 72 – Page 46</i>	 EVGA nForce 680i PRICE \$440 Stupidly over-featured and fast, if you've got the cash, then plonk it down here. <i>Reviewed in Issue 72 – Page 47</i>		
	AMD	 AMD Athlon 64 FX-62 PRICE \$1100 Sadly gets beaten by a mid range Core 2 Duo, but still the top of AMD's pile. <i>Reviewed in Issue 66 – Page 39</i>	 ASUS M2N32 SLI Deluxe PRICE \$295 Perfection in a motherboard. Beautifully laid out and overclockable to boot. <i>Reviewed in Issue 68 – Page 35</i>	OCZ Titanium Alpha VX2 PRICE \$736 Oil slick coloured sticks are slick as their rainbow colours show. Make sure your mobo can hit the 2.3V required to power them! <i>Reviewed in Issue 72 – Page 52</i>	GeForce 8800GTX SLI PRICE \$1000x2 The next generation is here, and it kicks arse. While we're still waiting for DX10 applications, for DX9 the thing utterly destroys the competition, providing you have a beastly CPU. <i>Reviewed in Issue 72 – Page 30</i>

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Coolers



Noctua NH-U9
PRICE \$60

It may only be 90mm, but its cooling power is exemplary, coming in only slightly behind its 120mm brother.

Reviewed in Issue 72 - Page 42

System drive



Samsung HD160JJ
160GB
PRICE \$90

Super quiet and yet still fast, the 160GB Samsung offers excellent value for money.

Reviewed in Issue 69 - Page 40

Display



Samsung 931C
PRICE \$470

2ms of raging colour gamuts and beautifully smooth tonality that will make you weep with joy and hug strangers.

Reviewed in Issue 70 - Page 56

Speakers



Steelcase 5Hv2
PRICE \$124

Awesome gaming audio performance on a shoestring budget. Phenomenal 'phones.

Reviewed in Issue 73 - Page 43

Cases



Cooler Master Ammo 533
PRICE \$115

Perfect for LANs with its heavy duty handle, military styling and rugged construction, the Ammo blasts the budget competition away.

Reviewed in Issue 60 - Page 50

Thermalright Ultra 120
PRICE \$75

Tower cooling that will keep your tower cool. Whack a Nexus 120mm fan on for near silent cooling.

Reviewed in Issue 72 - Page 42



Seagate Barracuda 7200.10 320GB
PRICE \$150

Seagate's fancy new technology makes this beast both fat and fast. We're almost at 1TB!

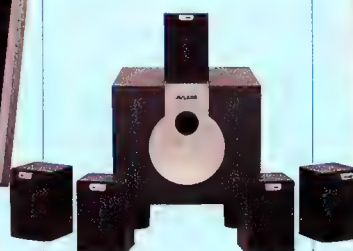
Reviewed in Issue 69 - Page 40



Samsung 244T
PRICE \$1550

Brilliance at 24", the 244T offers 6ms gaming, a wonderful gamut and more inputs than an alien hooker.

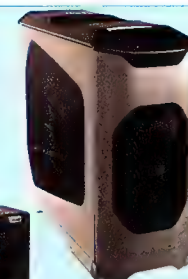
Reviewed in Issue 69 - Page 48



AVLabs AVL325
PRICE \$210

While it can't hold a candle to the Z-5500D, with a price this low there's no excuse not to jump to 5.1.

Reviewed in Issue 64 - Page 50



Cooler Master Stacker 830
PRICE \$310

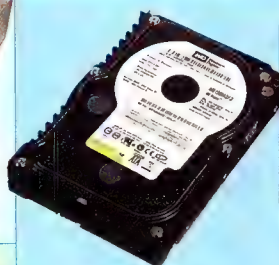
Like the Stacker before it, this sensational Stacker stacks sumptuous specifications salaciously.

Reviewed in Issue 61 - Page 36

Asetek Vapochill Lightspeed
PRICE \$1160

Vapour phase change. Ooooh. Vapour. Phase. Change. No matter how many times you say it, it's still cool (pun!)

Reviewed in Issue 64 - Page 38



Western Digital Raptor WD1500ADFD
PRICE \$380x2

Dear lord. The performance king hath cometh, short of whacking in a SCSI. Buy two and RAID 'em.

Reviewed in Issue 62 - Page 40



Dell 3007 WFP
PRICE \$2599

Thirty inches, 2560x1600, 11ms G2G. If you can handle the size and cost to run this massive beauty, you won't be disappointed.

Reviewed in Issue 61 - Page 49



Logitech Z-5500D
PRICE \$500

Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity.

Reviewed in Issue 48 - Page 56



Lian-Li PC-S80
PRICE \$490

The PC-S80 must have been designed by an ear-muff wearing design dude as it not only looks sleek and cools well, but it's super quiet to boot.

Reviewed in Issue 66 - Page 41

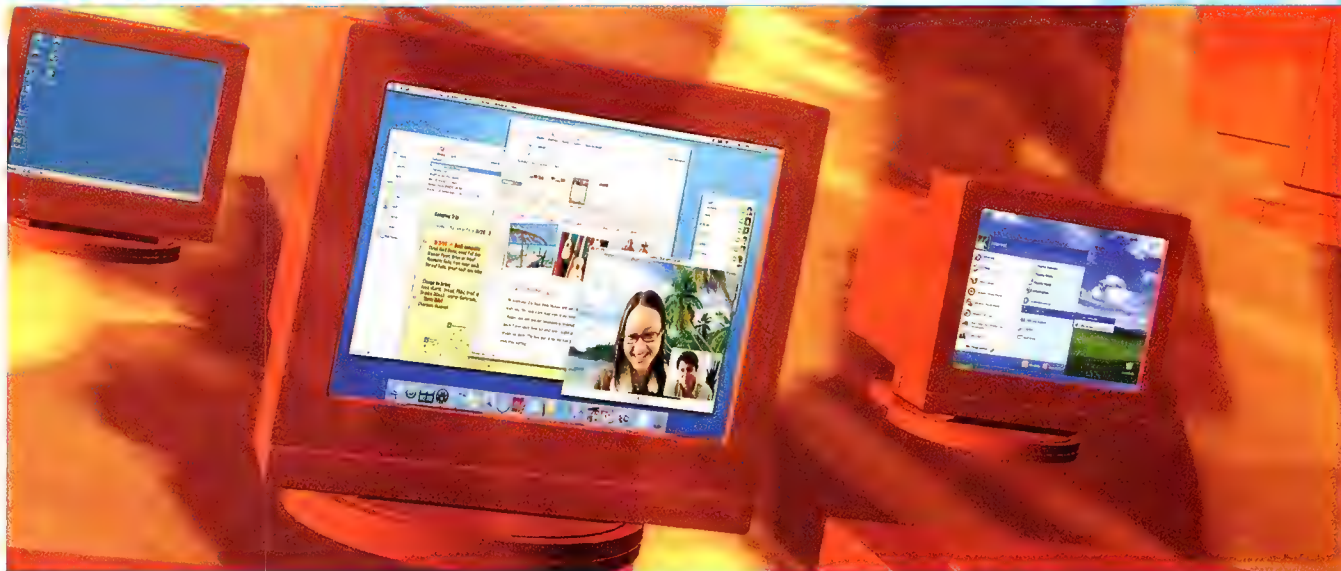
Cool-Trek Vostok
PRICE \$199

Until more extreme cooling systems come along that are AM2 compatible, this little kit will have to fill the gap. Make sure you get the updated mounting kit.

Reviewed in Issue 68 - Page 41



GROUNDZERO

Dan talks tech
like you've never
heard before

The Land of Wind, Ghosts and Minimised Windows

Daniel Rutter goes where no geek has gone before.

Here's a Zen question for you: Where is an icon? How, in other words, does your computer know where on your desktop to put it?

And I have another one: Where do windows go when you minimise them?

Both of these questions seem to have simple enough answers. Icon positioning, for instance, is just X and Y coordinates, innit? OK, relative positions change when you switch screen resolution, but that's no big deal. Pile stuff up on the screen edges if the resolution drops, create new empty space if it rises. Sorted.

And window minimisation seems simple, too. Stop drawing the window, draw instead a taskbar button, done.

Except it isn't.

Windows PCs, you see, have *screen* coordinates, which are indeed your basic graph-paper X and Y, and *workspace* coordinates. The workspace, basically, is the screen minus the taskbar.

You can see this difference if you put your taskbar at the top of the screen, Mac-style. Now, some subtly buggy programs will move their window one taskbar-height higher every time you minimise and restore them, because they save their pre-minimisation position using workspace coordinates and then restore it using screen coordinates.

Eventually, such windows will creep right up under the Taskbar. If the program's happy with negative location coordinates, its window can keep on going off the screen entirely.

The same problem can arise with a Taskbar on the left edge of the screen, but not with right or bottom-edge Taskbars, because coordinates start from the top left. Icon positions work the same way, and can in theory be screwed up in the same way.

But wait, there's more. Imagine that you have two monitors, one big main one running at 1600x1200, and one smaller secondary one running at 1024x768. If you innocently position the second monitor to the left of the first, you'll now have a workspace 2624 pixels wide, 768 pixels high on the left monitor, and 1200-minus-the-taskbar pixels high on the main monitor.

Programs which naively assume workspaces must be a rectangle can, now, give icons or whole *window* locations that lie in the black zone off

the edge of the lower resolution screen. (By the way, if you can't reach a window I suggest the utility Force Window Visible, tinyurl.com/yebtnq).

This coordinate system also means that your icons can end up all squished up on the right hand side if you start Windows with your secondary, left-hand monitor turned off.

Window minimisation is the real champion, though.

Windows can't, you see, just *stop drawing* a program's window when it's minimised. I think that's because you can't count on programs to redraw themselves correctly, or because they may freak out if one or more of their various window-drawing strategies is not correctly bit-bucketed. So what Windows actually does when you minimise a window is *move* the window.

WinNT and its descendants – possibly even Vista, though I'm not sure – move minimised windows to the location -32000, -32000. Way up there, eight to 10 metres above and to the left of your monitor(s), all of your 'minimised' windows are hanging in the air.

Win95 and its descendants, though, couldn't go that far, because Win95 was made for maximum compatibility and too many programs freaked out when presented with large and/or negative window locations.

Windows 95, 98, 98SE and ME, therefore, move 'minimised' windows to only +3000, +3000.

So, if you install Win98 on a computer with two really humungous monitors (or three normal screens), and tell Windows that the screens are in a diagonal line with the primary at the top left, you can see the Land of the Minimised Windows.

Perhaps, one day, we'll all have hard drives big enough that we can see the Home of the Overwritten Files. Or enough RAM that we can load software that hasn't yet been written.

Or sound cards that can record one hand clapping.

If Dan's hair grew in the forest but no one saw it, would it really be curly?

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GAMEPLAY

GAMES, GAMING AND GAMERS COVERED ATOMIC-STYLE

This month we've mixed in a few Xbox 360 games with the usual assortment of PC titles. Included is Star Trek: Legacy and Capcom's Lost Planet: Extreme Condition. If you're looking to make some console purchases, be sure to read these reviews. Also, Auran's RTS ParaWorld

makes an appearance this issue, as does the FPS The Mark. Not quite the bumper month we had last issue, but a nice selection of titles for January/February nonetheless. And, just for you, we had a chance to look at the ever-juicy Assassin's Creed. Mmm... ninjas.



GAMEPLAY CONTENTS

Engine Room Assassin's Creed 68

Lagan Booker checks out the next-gen spiritual successor to Prince of Persia.

Geekette 84

Is it possible to just turn out? Kate Inabinet knows the answer.

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Killing with style

Logan Booker sneaks up on Assassin's Creed producer Jade Raymond and poses a few fearsome queries on Ubisoft Montreal's stunning next-gen platformer.

With a mottled monitor in one hand and a slightly disused Intel 80386-powered PC in the other, you'd probably have a hard time keeping both aloft for any extended duration. But let's just say you had these two items – ideally on some sort of desk-shaped apparatus – and were lucky enough to be using them back in 1990s. Chances are if you were a bit of a gamer, sitting somewhere on the system's hard drive would be a copy of Jordan Mechner's *Prince of Persia* because, boy, did that game rule.

Prince of Persia featured animation the likes of which the world had never seen. Animation so extraordinarily fluid and life-like there's an unsurprisingly unverified claim that Walt Disney drowned in a pool of his own tears upon witnessing its magnificence.

Prince of Persia set the bar so high no game managed to reach it for eons. Yet attempts were made to replicate it, such as Delphi Software's *Flashback* that came much later. In the spirit of this hugely popular and technically

amazing game, Ubisoft Montreal, the studio behind the recent successors to Mechner's *Persia*, is having a crack at pushing that bar into the exosphere – and beyond.

That crack – or bar, depending on how you interpret the analogy – is *Assassin's Creed*.

Assassin's apprentice

Jade Raymond, the game's producer, explains that work on the game started as far back as 2003, shortly after *Prince of Persia: Sands of Time* shipped.

'A small core team was given the mandate to create a new IP specifically designed to take advantage of next-gen hardware,' says Raymond. The team comprised of Patrice Desilets, David Chateaufneuf, Alex Drouin and Richard Dumas, who now work as creative director, level design director, animation director and lead gameplay programmer on *Creed*, respectively.

'They already had a ton of ideas of where they wanted to take next-gen gameplay. Claude Langlais and Dominic





Altair does his best Beckham impression (right), then mixes it like Tyson.

Couture, who led the technology for Sands of Time, had their own vision for the engine and tools of the future.'

Raymond mentions that she joined the team a number of months later, to help add structure and focus to the design process.

What the team came up with was a game prototype called 'Project Assassin', a prototype that would eventually evolve into Creed. The game's protagonist would be, oddly enough, an assassin called Altair. Altair would be a member of the Hashashin sect, based in 1191 during the Third Crusade. His task: To knock off nine characters in history behind the Crusades. Creed however, is far from being a medieval Hitman. Creed promises to not only capture the rich environment of the late 12th century, but forge perhaps the most realistic looking and feeling character ever conceived in video entertainment.

'I think it's safe to say that the Crusades are an area we've wanted to explore for a long time, but we've been waiting for technology to reach a point where we can do it justice. It's not enough for us to simply set the game here – we needed to capture the experience of living during this tumultuous time: The fusion of European and Middle Eastern art and architecture; The hustle and bustle of medieval city life; the intrigue and political machinations of regional leaders; the gritty nature of ancient combat; the

air of mystery that surrounds the secret societies that rose to power around this time,' says Raymond.

Essentially, Ubisoft Montreal wanted to create a type of immersion that gamers would not have experienced before, for the simple fact that the technology just wasn't available.

'We've taken one of the most senior teams in the industry and challenged them to redefine action gameplay for next-generation systems. These are our creative best, they have all worked together before and they each have over eight years worth of ideas that they are anxious to put into practice now that the consoles have caught up,' says Raymond.

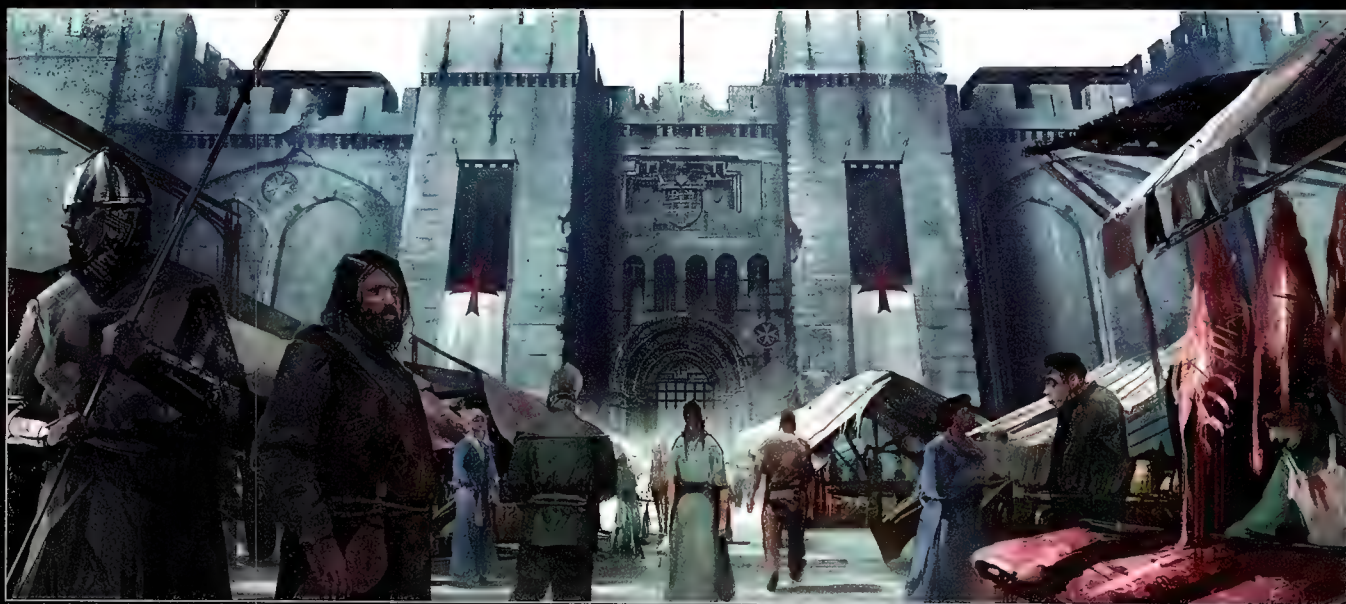
Graphique!

So what can we expect from Assassin's Creed? We've heard plenty of lofty claims that it'll be the next big thing since the self-loading trebuchet, but what exactly will be in the trebuchet? And by trebuchet, we mean the game. Obviously.

Firstly – unparalleled levels of detail. When we witnessed actually gameplay at E3 2006, it was a truly mesmerising experience. The frame rate



Altair goes about his business like a medieval Jedi Knight.



wasn't the best, but the texture resolution, shadows, cloth simulation and bump-mapping were streets, alleys and entire highways ahead of anything else on show. We can tell just from looking at the updated screenshots in this feature, that things have only gotten better.

'Even though the action takes place in the Holy Land during the Third Crusade, we really want the game to have very modern and cutting edge visuals. Our visual signature aspires to be in line with the emotional experience that the player will live instead of concentrating on portraying a specific setting,' says Raymond.

'To achieve such a result, we used a lot of post-production visual effects very similar to those used by the movie industry. Indeed, Assassin's Creed's art direction and visual effects have been highly influenced by films, especially for post effects and filters inspired by movies ranging from *Man on Fire* to *Black Hawk Down* and *The Butterfly Effect*. This was not possible on the previous generation of consoles.'

Gorgeous and utterly juicy graphics, however, were not enough for Montreal. In this day and age, it's never enough. Into this formula the developer has added what it calls 'The Crowd' and a movement style heavily influenced by both the game's spiritual predecessor, *Prince of Persia*, and a technique known as 'Parkour'. According to Wikipedia, Parkour is a discipline that dictates that one must 'pass obstacles in the fastest and most direct manner possible.' The result, using a combination of running, climbing, jumping and vaulting, looks incredibly fluid, natural and most importantly of all, cool. We can only imagine what it would be to like play a game that allows and actively encourages you to indulge in such play.

'The team decided to focus on crowd and freedom of movement to deliver new emergent types of gameplay. The Crowd has been designed as a living, breathing obstacle that you can influence through your second-to-second actions as well as through longer term strategies. The main character has an amazing design, over 1000 distinct moves and can interact with everything in the environment,' explains Raymond.

The Crowd is exactly that – a crowd. While in other

Above Try out your moves in this medieval meat market.
Below The Holy Lands, a crumbling but spectacular world.





games, NPCs serve perfunctory purposes such as adding 'life' to otherwise empty environments or as interactive information points, Assassin's Creed transforms them into an element of the environment that must be conquered with agility, not a sword. Bolt through a busy street and you'll knock yourself over. Run into a wall and you'll see stars and tweeting birds. Altair will pat, bustle, push and shove in increasing intensity depending on how fast you're moving or how frantic the action is.

'Altair's interactions with the crowd are based on a social dynamic, meaning we want to achieve a certain level of social realism in his interactions,' explains Raymond. 'In most games, it's not considered unusual to run around with your gun out and no one taking any notice. In fact, the very idea of running all the time is a bit silly; no one does this in real life! Thus, Altair has two modes in the game: a socially acceptable "low profile" mode, where all his actions are modified to help him blend in socially. In the second "high profile" mode, Altair goes into all-out hero mode, but simultaneously becomes more conspicuous, possibly putting his mission at risk,' says Raymond.

'These elements are pretty cool on their own but the magic lies in how they come together. Patrice Desilets, Assassin's Creed's creative director calls his philosophy "organic design" and I think it's this approach paired with the



team's experience and ambition that is making the game different and great.'

Ye olde inverse kinematics

While Ubisoft's Montreal's previous titles, including *Beyond Good & Evil* and *Prince of Persia*, were based on the in-house developed Jade engine and operated just fine using this foundation, *Assassin's Creed* demanded a more proficient technology capable of making full use of next-generation hardware. According to Raymond, Creed would just not have been possible on the venerable Jade.

'Before the next-gen specs were actually announced we had our own vision in mind of what next-gen should be. Building a new engine from scratch allowed us to create the rights tools to bring this vision to life.

'That said, doing this while developing a game was quite complicated as you have to wait for the tools in order to create your different behaviours that will compose your main character. It's like cooking food for the party of your life when you don't have any ingredients – it's quite a challenge,' she says.

One aspect of the Creed engine that has made the character of Altair possible is support for intense animation work, through the use of blending, inverse kinematics (IK) and ragdoll, as well as loads of traditional animation work. The developer has also made extensive use of procedural generation techniques to ease the creative burden.

'We've put a lot more animation files in the game, more than anything I've seen before. Therefore, variety is going to help us recreate a living and breathing world because our eyes are not used to seeing patterns in real life movements. All of the characters have a great deal of movements that they can perform so they feel more credible by reacting to different situations. AI is just as important for creating real in-game character as animation – a good mix of both is the key to success,' explains Raymond.

Above There's death at every turn in this line of work. Below The very best of 12th Century fashion.





In addition, programmers and character animators have had to work closely to provide the levels of detail that we've witnessed in the early builds. According to Raymond, this back-and-forth between programmers and animators goes against the usual 'client-provider' – in this case 'programmer-animator' – model found in other game studios. Ubisoft Montreal must be doing something right – the results really do speak for themselves.

Down to inches

Talked about, but perhaps not fully explained, is Creed's ability to generate player-negotiable terrain using, from what we can discern, displacement maps. Raymond explains that instead of painstakingly identifying surfaces that player can climb, special mapping tools can pick out and protrude ledges and the like and mark them as usable. Anything that sticks out more than five centimetres you can grab with any of your four limbs.

'That's the reason why the level design team is

taking a new approach... that they call "Free Path". In Assassin's Creed the player is given a bunch of tools and multiple ways to achieve each objective. A player could decide to clear the way by killing every guard in sight before finally reaching his assigned target or take a more subtle acrobatic approach to get to a target unseen,' says Raymond.

The game's artificial intelligence has also played a huge role in making Assassin's Creed a title of close-to-infallible realism. Sixty to 75 percent of the code is currently devoted to providing the brain power behind the Crowd, enemies and control of Altair.

Above Taking an undercover approach to assassination.
Below Horsing around may draw unwanted attention.
Below right Climbing can get you into the places you're not wanted.



'The Crowd and the AI systems have always been a core component of the gameplay,' says Raymond. 'To say that this had a huge impact on the team is an understatement: we've put a massive amount of engineering effort in realising an AI system that makes a large medieval town come alive. We're aggressively using technologies and strategies that are truly pushing the limits of what next-gen consoles can deliver.'

Assassin's Creed uses a layered AI to achieve its many results in a style that mimics somewhat Bethesda's Radiant AI for Elder Scrolls 4: Oblivion. At the lowest level an NPC can be set to wander, but a merchant could easily grab his attention, he could be bumped by Altair or he could get tired, altering his demeanour. On top of this is a higher level of logic that manages NPC needs and wants that is unique to that NPC and generated procedurally, and directs them depending on their current desires.

'At even higher levels are logic layers that manage tactics for guarding, fighting, chasing, fleeing, etc. Each layer of a NPC's awareness is simultaneously managed across hundreds of unique instances, with the calculations distributed across the multiple cores of the console,' says Raymond.

Assassin's quest

A dynamite package? From what we can see there's certainly potential for an explosion. The good kind.

When the game makes its debut on its development lead, the Playstation3, and eventually the Xbox 360, it will definitely cause as much of a sensation – if not more – than Jordan Mechner's original Prince of Persia.

Before signing off we asked Raymond if multiplayer had ever been considered for the title. According to her, a prototype was developed, but in the end it just took away from what the developer was trying to achieve with the solo experience.

'We don't want to add features if they are going to end up feeling gimmicky. We want to make sure that everything



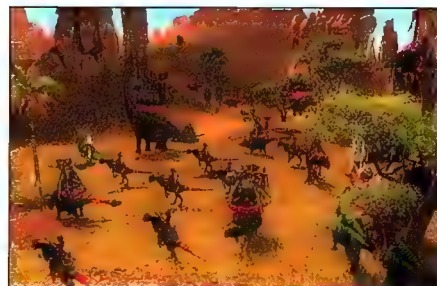
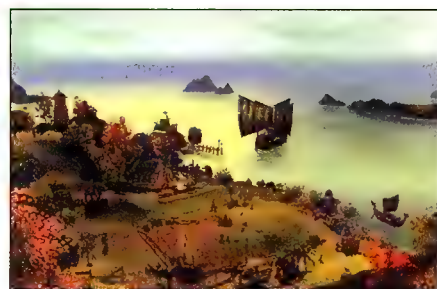
in the game makes sense within the overall experience and adds to it. So yes, our focus is the single player experience, no question about it,' she says.

And what of that mysterious futuristic element we've spied in some of the game demos and trailers? If you haven't seen them, basically when Altair dies, a white, slick and very advanced looking GUI appears, completely out of place with the Middle Ages time frame.

'Let's just say that everything we've shown so far was part of the design from day one,' was all Raymond would say. (E3)

Above Westfields at the time of the Third Crusade.
Below The Circular Quay of the Holy Lands... minus tourists.





ParaWorld

Logan Booker gets all Jurassic. He's even got a codpiece.

ParaWorld offers us the unique opportunity to play with dinosaurs. Not the plastic, slightly-toxic ones you had as a kid, but the real ones that would eat you, your brother and your pet dog Getty if you gave it the chance.

True, these prehistoric creatures aren't real in the sense that you could pat one on the head or blast it with a 12 gauge – after which it'd keel over and drop an egg. Nor would collecting 100 of these eggs grant you a free life or give you bonus points at the end of the

level, because it's real life, not Mario Brothers.

And ParaWorld is as far from both Mario and the real world as a game can be.

What ParaWorld does, however, is give you the chance to train dinos, along with elephants, elks and humans, and wage war on your fellows who, unsurprisingly, can construct a similar array of beasts to throw down upon you. It is a real time strategy for the little archaeologist inside us all.

The game starts out a bit rough, subjecting

the player to the most horrendous and unintentionally comedic intro cinematic in game history. It does about as good a job explaining the story as a mute antelope in a tank of milk.

Simmering down to the essentials, three entrepreneurial scientists – Anthony Cole, Stina Holmlund and Bela Andras Benedek – come to the conclusion that the world is not what it seems, that a parallel world exists beside their own. The three visit Jarvis Babbit, a genius who provides funding and assistance to ventures pursuing science's greatest conundrums. Somehow, Babbit convinces the three not only to board a plane and fly out to the middle of nowhere, but also to give their permission to be dropped into a swirling vortex in a box with a giant parachute. With heroes this gullible he probably should've demanded a few million up front and just plunged them into a combine harvester. It's not like the world would have suffered any great intellectual loss to its scientific community.

Putting aside the utterly ridiculous plot, ParaWorld is a competent RTS with a few interesting additions to mix up the formula. The first is the Army Controller, a panel situated in



UNDER CONTROL

How much work the Army Controller sees is up to you. You can play ParaWorld like a traditional RTS, to the point where you can hide the AC interface and ignore it altogether.

If you do decide to make use of it, you'll find it offers you more control and situational awareness over what you'd have otherwise. As you build units, they will be allocated on to the AC, and you can monitor their build progress. When units get attacked, the AC will let you know and, you can box select unit portraits just like you can on the battlefield.

the bottom left of the screen that shows you ever single unit you control. It is the definition of convenience, providing instantaneous information related to your troops – be they in combat, being built, whatever. Units in this panel can be ordered depending on their usefulness. So, for example, you could have all your workers at the bottom of the panel, with stronger units filling up the top section.

The second addition is a stockpile resource system. Instead of having unlimited space to store harvested food, wood and stone, storage is determined by the number of resource-gathering building and town centres you have. This means in order to increase your production, you'll need to make sure you build up the civil backbone for it first. It also serves to limit rush tactics, as support buildings must be constructed alongside military ones.

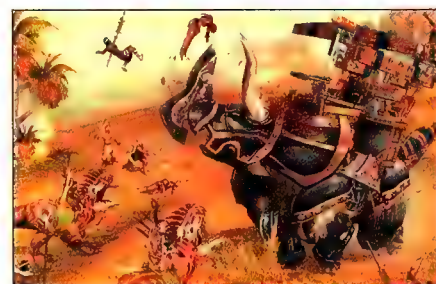
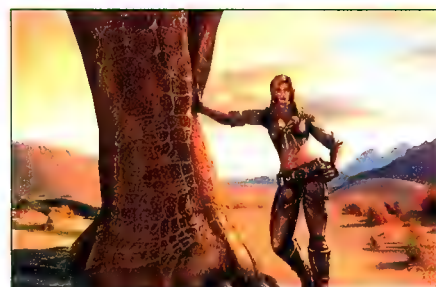
The final notable feature is the unit upgrade system that uses 'skulls', or kills, as payment. The more enemies you slay the more skulls you'll accrue, and for around 25 skulls you can upgrade a unit from level one to two. For heroes, this provides not only a boost in strength, but special auras that improve the prowess of the troops around them. This is an excellent mechanic that promotes players to get into the action, rather than turtling, and

provides a way for aggressive players to 'tech' without sitting at home clicking on upgrades all day.

Although developer SEK has gone to the trouble of building a 3D engine, the game looks about five years old. Even zoomed out the units appear simplistically built of a few random polygons and a splash of colour to broadcast their allegiance. The more complex creatures, like dinosaurs, are given a healthy poly and texture budget, but up close still look like the work of a 12-year-old just getting started with 3dsmax.

Gameplay wise, ParaWorld makes use of an Epoch upgrade system and this, combined with the simplistic graphics, give the game an 'Empire Earth' feel. Unlike Empire Earth, each Epoch provides only a subtle change in graphics, serving more as a way to access better units. Don't expect to upgrade from bows to muskets though – ParaWorld keeps itself distinctly in the Stone Age.

ParaWorld is an engaging RTS that will please fans of genre, thanks to a fresh environment and some tasty additions in the form of the combat-oriented upgrade system, Army Controller and resource system. However, the simplistic graphics, lack of polish and the horrible story detract heavily.



Back in the day, warriors would toast with fire on sticks and drink the flames after a successful battle.



PARAWORLD



Developer **SEK**
Publisher **Auran**
Website **www.paraworld.com**
Recommended **2GHz CPU; 512MB RAM; 128MB DX 9 card.**

VERDICT

Army controller; fresh environment; skull upgrade system; anti-stockpiling resource system.

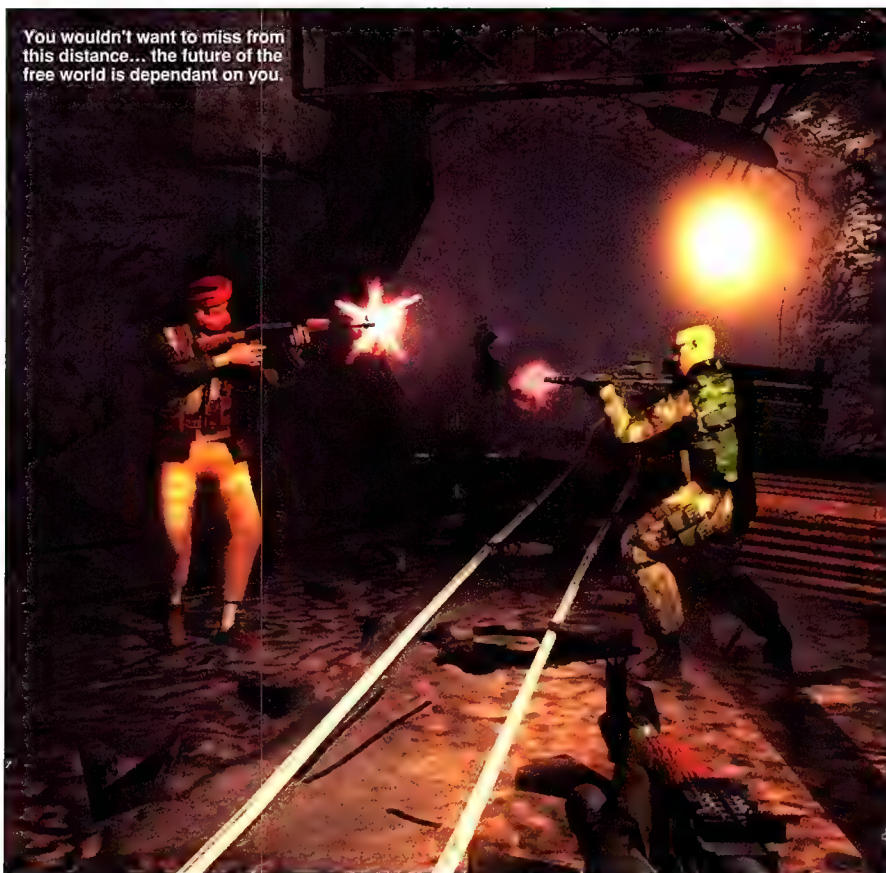


Awful, awful story; average graphics; lacks a little polish.



SCORE **7.5** OUT OF **10**

You wouldn't want to miss from this distance... the future of the free world is dependant on you.



The Mark

Chris Booker has an identity crisis.

The first person shooter genre is about running around and shooting people. But what sets them apart is the ability to draw you into the game, to tell a story in which you are a one-man army fighting for survival or some greater good. It's the difference between a sticker on the box labelled 'Game of the Year' and 'Now only \$20!'. You play it to the end because you really want to know what happens. Sadly, The Mark falls into the latter category.

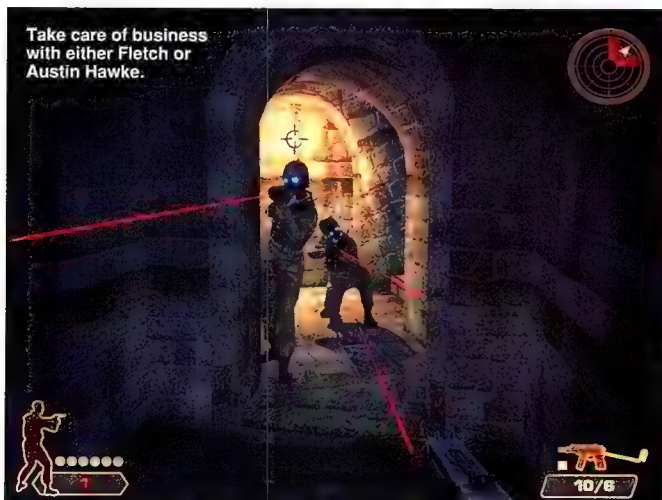
The plot is fairly simple: Terrorists have obtained a nuclear warhead and plan to use it against the free world, and there is only one man who can disable the device – Steve 'Fletch' Fletcher. The terrorists know this and have put a bounty on Fletch's head. But here's the twist: An independent bounty hunter, Austin Hawke, has been contracted to keep Steve alive so he can defuse the nuke. Unfortunately, the plot is more an excuse to have two playable characters than

something to follow.

Before each section of the game, the player can choose to play either Fletch or Hawke. They each possess a special ability, Fletch's takes the form of a 'bullet time' mode, and Hawke's a short distance radar that will pick out foes, even from behind cover. They also use different weapons, an assault rifle and a shotgun respectively, though you pick up other weapons during play. You can actually also play the game through, and each character's paths are different, sometimes crossing over. You will do something as one character, and then reload to play as the other and see the events unfold from their perspective.

Health takes the form of painkillers, 'Max Payne' style, where you can carry a few with you and use them as needed.

The gameplay is a little clunky. It's sometimes hard to tell where you're being shot at from, resulting in having to reload once or twice just to find out. Guards also don't make any noise,





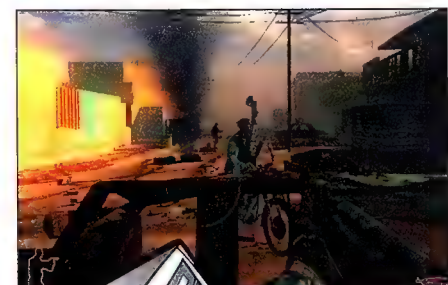
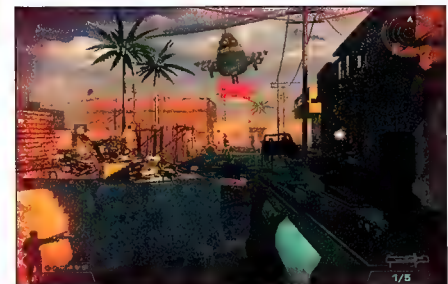
which is fine if you're playing a sneaker FPS, but this is, as described on the back of the game box, 'adrenaline soaked', and silent guards hardly screams 'adrenaline soaked'. In fact, it doesn't scream much of anything.

There is also no way to turn off the auto-reload. A minor point to some, but a big one for FPS fans everywhere. Finally, the recommended specifications include a 256MB video card, but we can't see why when playing. If anything, we've seen games with superior graphics run smoother than this.

Of all the discount label first person shooters we've played, however, this is one of the better ones. The bullet time system is well implemented. You have a charge bar, and a

portion of it is depleted when you activate it, creating 10 seconds of slow motion. It recharges fast enough so you can use it often, but not enough to make the game too easy. The radar will designate enemies with a red diamond so you can see exactly where they are. Quick saves are quick and when you can actually see your opponent, the firefights are a fun challenge. You can't go in guns blazing, or you'll get owned, so you must make good use of cover. The characters also throw banter between themselves that is *barely* entertaining.

While it's not the best FPS ever, it's good for a discount title. So if you feel like saving pennies on your next FPS purchase, you could easily do worse than this.



Developer **T7 Games**
 Publisher **Red Ant**
 Website **www.themark-game.com**
 Recommended **2.8GHz CPU; 1GB RAM; 256MB DX 9 card.**

VERDICT

Bullet time; value for money; useful AI partner.



Hard to find enemies; unusually high system requirements; auto-reload.



SCORE
6.0
 OUT OF 10



Lost Planet: Extreme Condition

'Snow way to die in this chilly shooter, says Logan Booker.

Perhaps the first thing you'll notice about Lost Planet: Extreme Condition is that there's a lot of snow. So much snow that developer Capcom could have completely done away with the protagonist's feet and the player would have been none the wiser. The second thing you'll pick up on is that Lost Planet isn't set on Earth, but a world called E.D.N. III, and it's about as hospitable as a hobo's pee-stained cardboard box.

No doubt you'll notice a bunch of other things, like that the protagonist's name is Wayne, it's a third person shooter and the graphics are rather pretty. So let's talk about some of the stuff you might not catch on to immediately.

For instance, E.D.N. III was an attempt by civilisation to settle on another planet, except

it didn't go as planned. Humanity came face to face with E.D.N. III's hostile natives – insect-like creatures known as the Akrid. The Akrids proved to be a bit too hostile for human tastes and drove them off the planet. This spurred development of Vital Suits, or VS – mechanical walkers armed with Gatlings, rocket launchers and lasers, to combat the Akrid. With their new robo pals, humans once again tried to settle on E.D.N. III with a great deal more success.

In the game, you play Wayne, a colonist and VS pilot that's lost his memory. All you can remember is that your dad was killed by a giant Akrid known as the 'green eye'. Wayne's discovered by a band of snow pirates, close to frozen, who promptly set him to work nailing Akrid hives. Keeping close tabs is a mysterious corporation known as Nevec and Yuri, the



somewhat cryptic leader of the band of pirates you're working for.

Gameplay in Lost Planet is broken into two parts – the longer bit, which involves running Wayne around in the freezing cold, shooting up Akrid and enemy snow pirates. The second, shorter bit has Wayne piloting VS robots and taking on other VS users, boss Akrids and scooting around the icy countryside.

In 'Wayne' mode, the right trigger shoots your equipped weapon, of which you can hold two, while the left tosses grenades. 'X' fires the 'anchor' tool that allows Wayne to scale walls and cliffs.

You start out with a basic machine gun, but Wayne's arsenal improves quickly with shotguns, energy rifles and rocket launchers. In fact, 95 percent of all the guns in the game are introduced in the first two levels, burning away a bit of motivation. Really, the only thing to look forward to is hunting down increasing larger breeds of Akrid, and piloting various cool VS.



DON'T MIND IF I DO!

VS weapons aren't just for Vital Suits – you can wield them too. Wayne can pull Gatlings and rocket launchers off operational and non-operational suits alike and unload into nearby Akrids. Only thing is you won't be able to switch weapons while carrying a VS gun and you can only carry one at a time. When you're done, you can drop the weapon or re-attach it to a VS. Perfect for when you need a little extra firepower.



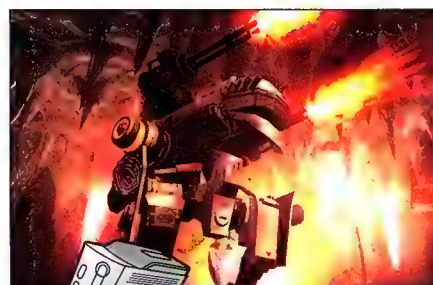
While in VS mode, the left and right triggers fire the left and right equipped VS weapons respectively, while the 'Y' button activates the VS special – this can range from transforming into a rocket bike, activating a hover mode, or launching destruction and mayhem.

It's about now we should mention that Wayne's existence is entirely dependent on his supply of thermal energy, or T-ENG. T-ENG is collected from barrels and harvested from dead Akrid. T-ENG not only keeps the cold out (slowly ticking down constantly as it does so), but powers energy weapons and replenishes your health. Actually, it's pretty darn good at giving you your health back, and, once you have a plentiful supply of T-ENG (not at all a hard thing to do) only two direct rocket hits, one after the other, stand any chance of doing Wayne away.



Basically, with enough T-ENG, you're almost invincible and most often the best strategy is to just charge into the middle of your opponents and either let loose with the shotgun or drop a grenade at your feet. Both options are pretty effective. Piloting a VS also drains your T-ENG, as does firing any energy weapons, discouraging their use.

Otherwise, Wayne doesn't do terribly much but run around shooting Akrids and snow pirates, and with all the weapons at your disposal so early in the game, things get repetitive awfully quick. Despite this, Lost Planet is still a solid third person shooter with a nifty mech element, but the drab, hardly-changing blue/white snowy environments, close-to-invincible protagonist and repetitive gameplay make it a lot less fun than it could have been.



Developer **Capcom**
Publisher **Activision**
Website **lostplanet-thegame.com**
Players **1-16, DM and team DM**
Other platforms **None**

VERDICT

Vses mix up gameplay; energy counter keeps you alert; great graphics; hearty combat.



Gets repetitive quickly; Harmonizer makes you almost invincible; so much snow!



SCORE
7.5
OUT OF 10

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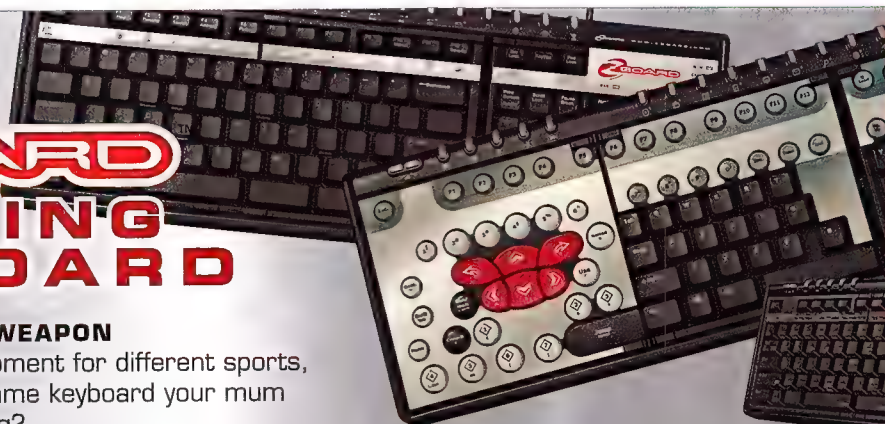
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That is the sound of a million *Star Trek* fans crying into their Wolf dolls at Legacy's raw crapness.



Star Trek: Legacy

Logan Booker wants to know why there are no flying cars.

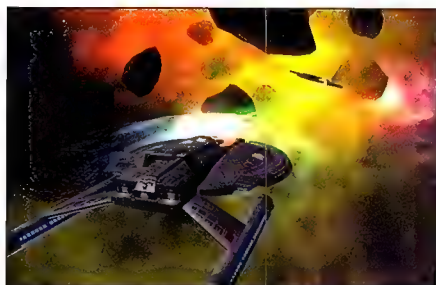
Of all the games created based on the *Star Trek* franchise, only two are worth playing – Microprose's *Birth of the Federation*, an excellent 4X with interactive 3D battles and Interplay's *Klingon Academy*, a starship simulator where diplomacy was often more prudent than a blast from the phaser banks. While we'd have been more than happy to promote Mad Doc's *Star Trek: Legacy* into the ranks of the greats, a slew of flaws, limitations and poor control decisions place it firmly in

the barracks with the non-commissioned.

Legacy spans the entire history of the *Star Trek* series, from the recent *Enterprise*, all the way back to *The Next Generation* and *Voyager*. For your money, you get voice acting from Scott Bakula, William Shatner, Kate Mulgrew, Patrick Stewart and Avery Brooks; about 60 ships to fly and blow up, and four races – the Federation, Romulans, Klingons and Borg. Note that the latter three races and their ships are only available in multiplayer; the single player

campaign is limited to just the Federation. For those without Xbox Live or other ST-obsessed mates, a Skirmish mode is available to combat AI opponents.

The best way to describe *Legacy*'s game-proper is as a small-scale fleet simulator. While you're provided with your command ship, usually the USS *Enterprise* in one of its various incarnations, you'll also be in control of up to four other vessels, purchased with command points received after each mission. Switching to each craft is handled via the D-pad, and holding a particular direction on the pad 'groups' that ship with the one you're currently flying. You can then issue orders to attack using the right shoulder, or deselect ships by again holding the D-pad in the direction of the one you want to ungroup. The left trigger fires photons, the right phasers, and holding down the left trigger allows you to assign repair priorities to your ship. A sector map is also available via the Back button and if you have any sort of





A phaser a day keeps the Klingons away. Unless all your bases belong to them.

tactical cognition you'll spend more than a few missions clicking frantically on this blue and white monstrosity.

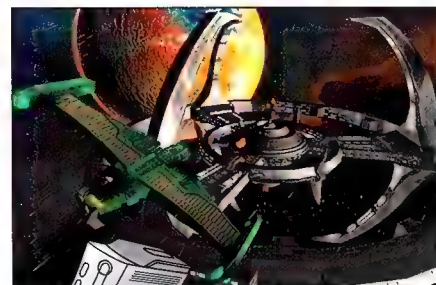
We have nothing against a fleet based game, as long as the control system allows fluid sending of orders and accruing situational awareness. Legacy fails at both. Fleet control is a nightmare, and getting your ships to do exactly what you want, when you want, is just not possible. The current system will have you switching ships just as often as you select them, and it boggles the mind why some sort of 'select an enemy, hold a button, flick the D-pad to send the attack order' control system wasn't implemented. The 'select the ships I need to send orders to precariously with the D-pad, oh crap, I've switched ships and lost my selection better switch back, oh darn, I've just selected it instead, damn I've lost the mission' thing Legacy has going is pitiful. You can switch to the battle map to send orders and this works okay, but we can't say we're game enough to do it in the frenzy of combat.

Developer Mad Doc recruited the help of *Star Trek* writer D.C. Fontana to create the story line,

but you'd be forgiven for thinking they'd thrown the script at an intern for all the entertainment it provides. Perhaps the sheer number of episodes has burnt the creativity out of the series, leaving nothing for another spin-off, let alone a game, and it's doubtful the combined powers of Arthur C. Clarke, Isaac Asimov and Harlan Ellison could come up with anything compelling that hasn't already be contemplated and re-contemplated by Kirk, Picard, Sisko, Janeway or Archer.

If you've come for the voice acting, don't get your hopes up. Scott Bakula sleeps through his lines in the first story arc and while things improve when Stewart hits the scene, you're not going to buy Legacy just for the high-society English overtones of the 'supposedly' French Jean-Luc.

Combined with so-so graphics that are good by the franchise's terms but dated when compared to other Xbox 360 titles, and a HUD font that will have you squinting at your screen to read torpedo counts and shield ratings, Legacy will be quickly relegated to the bargain bin of your local games shop, or just your bin at home.



Developer **Mad Doc Software**
Publisher **Ubisoft**
Website **startrek.bethsoft.com**
Players **1-4**
Other platforms **PC**

VERDICT

All the great Star Trek captains and ships in one package; phasers!



Boring campaign; rancid fleet control; 'arcade' starship combat doesn't work.



SCORE **5.5** OUT OF 10

THE ² Fang GAMEPAD

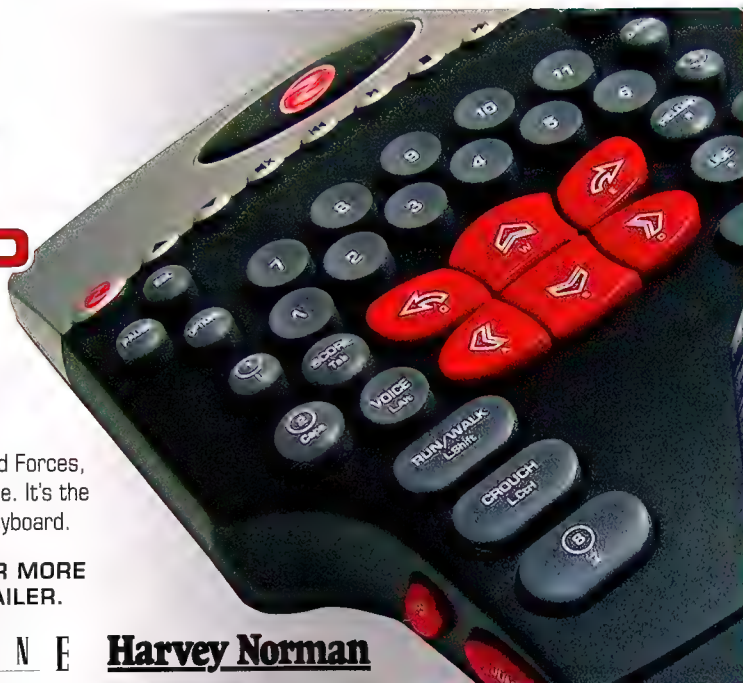
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Everything you need to know about geek film, music and literature



There's nothing like a walk in the woods to escape wall-to-wall tragedy.

Pan's Labyrinth

CINEMA

Starring Sergi Lopez, Ivana Baquero, Alex Angulo, Doug Jones, Maribel Verdu. Director Guillermo del Toro. Distributor: Hopscotch Films. Website: www.panslabyrinth.com

Billed as a 'horror fantasy', *Pan's Labyrinth* is nothing less than a master piece of storytelling and the cinematic craft. Mexican director Guillermo del Toro (*Hellboy*, *Blade II*), who also wrote the flawless screenplay, is a master of his craft and *Pan's Labyrinth* his break away from big budget Hollywood epics.

Pan's Labyrinth is part gothic horror, although there are few truly frightening scenes. It is part a childhood fairytale, although there's nothing in this flick remotely suitable for children. It is part a struggle for freedom against tyranny, and it is a tale of the extremes humans are capable of to achieve their desires.

Set in Spain in 1944, *Pan's Labyrinth* plots two tales running in parallel, each seemingly worlds apart. The shockingly brutal background is Franco's Spanish fascist regime fighting for its survival. An utterly evil military commander, Captain Vidal, rules over a small village. He, and his henchmen, are brutal, cruel and regular off-the-shelf 'Nazi bastards'. Running throughout

the film is Vidal's battle with the local resistance movement, aided by sympathisers from the village. While Vidal's sadistic cruelty casts a shadow of futility over the villagers, they struggle on to find optimism within the nightmare.

Into the horror arrives young Ofelia, a sweet child, and her mother Carmen, pregnant with Captain Vidal's son from an earlier non-consenting encounter. Knowing that the unborn child's survival is the only guarantee of staying alive in the war, Carmen and Ofelia are forced into a charade of playing family for Vidal, even though he treats them like rubbish.

There's nothing but wall to wall tragedy in *Pan's Labyrinth*, each character pushed to extremes, whether it be violence, or the necessity of survival. But, while this intense world, its events and characters fill the screen, a completely incongruous story comes into play.

It is amid this dark world of trapped destinies, that Ofelia is visited on the first night by an elf, who takes her to meet Pan, a guardian of the underworld. Here begins a classically framed fairytale that works perfectly as both a complement to the real world action, and a frequently necessary distraction away from it.

Throughout the film neither story overshadows the other and neither should technically be expected to work with the other. But they come together masterfully. You will be as gripped with each, and as things come together the true genius of the film becomes apparent.

Guillermo del Toro's direction is sublime. The film runs a perilous gamut that would tempt many other directors to commit sins of schmaltz, but he doesn't put a foot wrong, and his control and measure weaves together a masterpiece that will invade your thoughts for many days after seeing it.

For one of the most impactful and satisfying film experiences of recent years, *Pan's Labyrinth* delivers a treat of unexpectedly generous proportions.

score **9.5** OUT OF 10

Win 1 of 5 double passes to Pan's Labyrinth!
www.atomicmpc.com.au/competitions

Pan's Labyrinth is out in cinemas nationwide on 18 January and we have five double passes to give away. To be in with a chance, just head to the competitions URL above, click on the *Pan's Labyrinth* link and answer a question on the movie. But get in quick, the competition closes on 17 January! Thanks to Hopscotch Films (www.hopscotchfilms.com.au) for this fantastic prize.



Part gothic horror, part childhood fairytale.



A Bittersweet Life

DVD

Starring Hwang Jeong-min; Lee Byung-hun; Kim Yeong-cheol
 Director Kim Ji-woon Distributor Madman
 Website www.madman.com.au

If there's one thing that *A Bittersweet Life* will teach you, it's that Koreans know how to make movies. Well, they know how to do noir. It'll also teach you that it's not a good idea to get drunk around one of them if he's had a bad day, as he's liable to kick you and throw away your car keys. The plot centres on Sun-Woo, a restaurant manager with some serious connections. As is often the case, he gets himself into a spot of bother when he refuses to bump off a crime lord's unfaithful floozy. A simple story, at first glance. Shallow, even. But like *The Wrong Man* reminded us last month, appearances can be deceiving. It won't be until the credits start to roll that you realise how just subtle the character development truly is.

The packaging claims that *Bittersweet* is ultra-cool and it's not lying. The fight scenes are, for most of the part, perfectly choreographed. The shootout at the end, while hardly innovative or unique, is stunning. While he loses his footing around the half way mark, it's hard to deny that director Kim Ji-woon is a true artist. He skilfully manages to transplant Sun-Woo's rather casual attitude towards violence, meaning no matter how bad it gets you never find yourself looking away or hating him. That said, *Bittersweet* – like all good noir – is occasionally quite funny, albeit in a very dark way. Definitely excellent, but by no means perfect.

score **8.0**
OUT OF 10



Godzilla vs Mothra

DVD

Starring Akira Takarada; Yuriko Hoshii; Yu Fujiki
 Director Alfonso Ishiro Honda Distributor Madman
 Website www.madman.com.au

If you've never seen a monster movie, you haven't lived. They're essential viewing. A cinematic experience that's spectacularly trashy, so unashamedly inane, so deliciously self-indulgent that it can't be missed. And no, before you even think it, that American... thing with Jean Reno and Matthew Broderick wasn't a real monster flick. This, however, most certainly is.

Godzilla vs Mothra has everything you'd expect from this wonderful genre, and then some. There are psychic fairies that sing and travel in a box. There's a female lead whose get up could be best described as part Sherlock Holmes, part *Iron Chef* guest panellist. There's a bumbling journo who loves boiled eggs. And there's the tribe that just comes out of nowhere to beat drums, shake their heads en masse and pray. The storyline, a sort of ramble about the evils of capitalism that eventually scoots off on some ridiculous tangent when Godzilla shows up, is actually quite sane by Toho standards. Granted, that doesn't mean much. The fights aren't as good as the ones in the Gamera films, but at the same time *Godzilla vs Mothra* is nowhere near as camp. It's actually vaguely serious in parts. Vaguely. Worth a look if you're into the genre and haven't seen this one yet, just don't expect it to live up to the praise it's given in some circles. If you're new to the whole monster thing, though, it'd probably be better to start with something like the delightfully fruity *Gamera vs Guiron* instead.

score **6.0**
OUT OF 10

ANIME OF THE MONTH

Your regular dose of anime goodness courtesy of our resident expert Arminia Soemino

Streetfighter II: The Movie (Uncut)

Studio Various Distributor Madman Web www.madman.com.au Price \$24.95

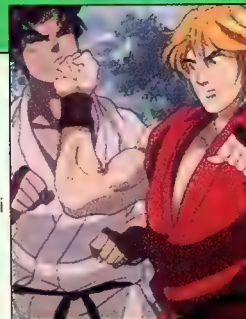
Like a dragon uppercut, *Street Fighter II: The Movie* is fast, classic and jam-packed with action, and if you've been waiting to own this timeless anime, now's the time with the release of the uncut version.

The story centres on Ryu and Ken as they are caught up in a master plan concocted by the evil Shadowlaw organisation, headed by Bison, who is abducting and brainwashing street fighters to use as assassins. After learning of his overwhelming potential, Bison seeks out Ryu using his best friend, Ken, who daydreams about the rematch they never had.

When it comes to animation, *Street Fighter II* packs a punch. The art is high quality and the fights are so fluid they're more realistic than the live-action Van Damme version that was so terrible it made you want to poke your eyes out with a knitting needle. It also focuses more on the characters and the moves we know and love. True to form, Chun-Li engages in a

Lightning Kick and Dhalsim spins through the air in a Yoga Spin. Speaking of Chun-Li, hentai fans will be impressed with her shower scene in which she gets err... wet.

The only downside is that the story tends to drag a little between the fight scenes but that's standard for most action movies. It also suffers from 'too many cooks spoil the broth' syndrome with a glut of characters that have been thrown in for tokenism's sake. But all things considered, *Street Fighter II* makes for fine viewing and not just for Chun-Li's assets. It'll make you want to gather your internal energy and unleash a *hadoken* of your own.



score **8.5**
OUT OF 10

GEEKETTE

A girl's eye
view of the
gaming world

Here's to not dying from a
stress-related illness!



Bout of doubt and burnout

Kate Inabinet can't decide on a good pair of gumboots.

When most people think of a burnout, they picture a bunch of bogans doing doughnuts in their high-school car park. Animators on the other hand, see a burnout as something infinitely more sinister than a smoky tribute to Torana, the God of Mullets. At worst, it can destroy your career like cheap tyres on asphalt. At best, it can leave some serious skid marks in your favourite self-esteem shorts.

Creative burnout is the complete mental breakdown that artists suffer after being pushed too hard for too long without a break and it is a malevolent beast. It creeps up on you like Troy from accounting at the office Christmas party, breathing down your neck and slopping Bundy and Coke onto your top before gearing up for the ultimate grand gesture of throwing up all over those \$400 shoes you had been saving for a special occasion.

Just as Troy – all leering grin and drunken swagger – was visible lurking in the shadows if you had been keeping an eye out, so the signs of burnout are easy to read if you are aware of them.

First come the delusions. Your brain starts playing evil tricks and you find yourself fretting over a task for an entire day, only to go home still unsatisfied, even after the six millionth adjustment. Hot tears sting your face as you anticipate the flaying you will receive from the boss once they catch sight of such a grim excuse for an animation. The next morning you careen into work at some ungodly hour with the intention of a do-over before the day has even begun, open up the file and discover that there was absolutely nothing wrong with it, nor the previous few million versions.

Dementia follows. What once took you only an hour or so to achieve, now takes the better part of a day. Sometimes more. Sometimes a sneaky weekend and a couple of all-nighters depending on the severity of the torpor. Using old models or animations as reference offers no relief, as no matter how long or incredibly you stare at them, your poor fevered brain struggles to recall the creation.

Next is the nightmare as your mind shudders to a complete halt. You find yourself parked in front of the computer screen, staring slack-

mouthed and eyes glazed like a 13-year-old boy in front of his first set of norks. A trickle of drool hangs listlessly from your chin as the day ticks by in slow motion, your hands all the while remain stubbornly frozen in twin claws of terror.

Paranoia starts to take hold as you convince yourself that your every futile move is being watched by office spies and recorded for future review.

Panic rises in your throat like a silent scream as time previously spent working is replaced by furtive glances over your shoulder and constant speculation on who is keeping tabs on just how long you spend looking up tutorials on how to do things you were once completing three-to-a-day only months before.

Then finally, hysteria hits you full in the face. Maniacally you begin adding up your annual leave and working out how long you can take off to put together a portfolio in case you should need it in a hurry. Once you reach your holidays, your body goes into meltdown and you simply don't have the energy, physical or mental, to produce anything of significance so you retreat into a ball of un-productivity under the doona with a bottle of vodka and an endless supply of Sandra Bullock films. After a couple of weeks of living in your own

filth, you emerge like a butterfly from the cocoon of self-loathing to find that you are actually looking forward to going back to work.

Last year, the burnout was so close the acrid stench of burning rubber is scorching my nostrils. I was counting down the days to my holiday break, which arrived just in time to give me that much-needed rest to be fresh for the New Year. Oh, and that perfect pair of Wellington boots that I found for the office Christmas shindig and the ever-present Troy came in very handy too.

If anyone wants Troy's phone number Kate doesn't need it and would be more than happy to pass it on.
geekette@atomicmpc.com.au



“ You find yourself staring slack-mouthed like a 13-year-old boy in front of his first set of norks. ”

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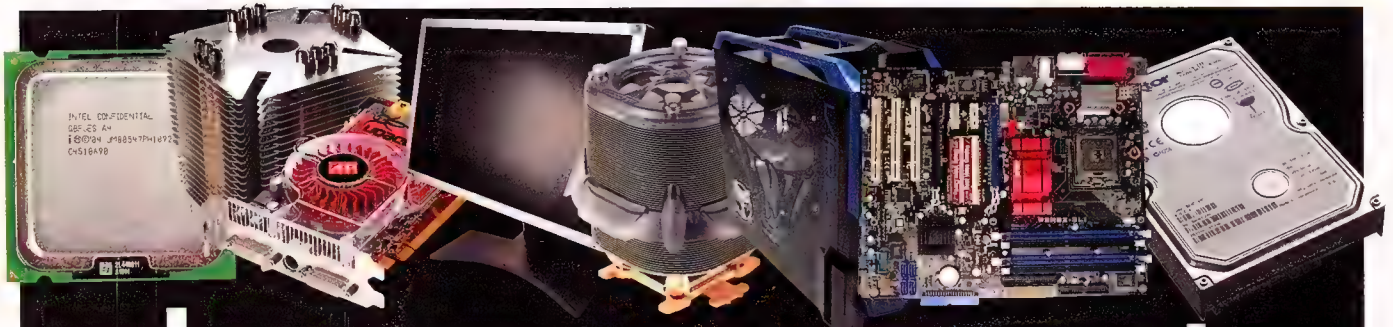
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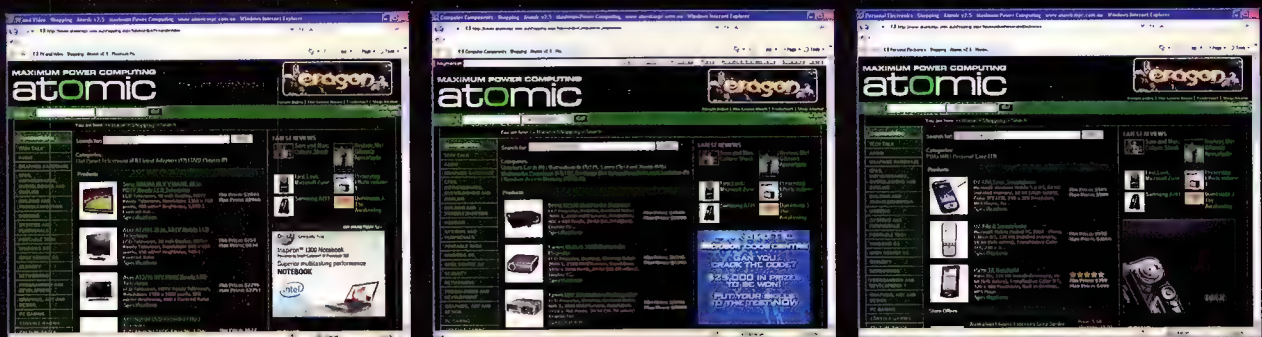


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TECHNIQUE

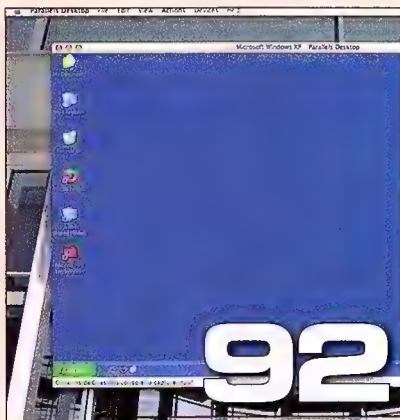
HANDS-ON TUTORIALS FOR THE TECHNICALLY INCLINED

Welcome to Technique, Atomic's kick-arse tutorials section. No doubt you've been here before, or maybe you even frequent this section er, frequently.

Regardless, this month Technique has something for both new and

old readers, including the continuation of Jake's Mac virtualisation tutorial and Luke St Clair's excellent blowhole tutorial.

As always, the all-knowledgeable Dan Rutter brings up the rear with IO, with Hotbox in support.



TECHNIQUE CONTENTS

Mega blowhole mod 88

Luke 'Defyant' St Clair can't stop modding. In fact, he's decided to put a bloody great big hole in the front of his case for cooling purposes. Find out how you can do this with nothing but time and putty.

Run multiple OSes under Mac, Part 2 92

Jake Carroll once again embarks on the ultimate in virtualisation – not only running different operating systems under the one OS, but sharing resources between each of them.

Input Output 95

Dan Rutter needs to fix things, or else he'll die. Well, he might get a bit bored.

Hotbox 98

Hot cases for people who like hot cases. Or liquorice.

Have an idea for an Atomic tutorial?

Then send an email to lbooker@atomicmpc.com.au!

When it comes to tutorials, Atomic likes to tackle the hard stuff. If it's not hard enough, we just don't do it. Alright – that's not necessarily true, because every once in a while, we like to cover the easy tutorials too. Not so much easy as basic, you know... building the skills, the foundations you need so you can have a go at those tricky tutorials.

We know that techniques change, as does technology, and guides that might have been useful a few years ago can be close to useless today. So, if you have an idea for a basic tutorial, like soldering, water-cooling or harpoonising whales meat, let us know. Now go email!



DIFFICULTY HARD Add a blowhole to your PC

Luke 'Defyant' St Clair shows you how to cool your PC in the most extreme way.

SUPPLIES

TOOLS

- Saw
- Dremel
- Electric hand sander
- Rulers and pencils
- G-clamps or clamps

CONSUMABLES

- Jigsaw w/ fast-cut blade
- Stanley knife
- Putty applicator
- Hot glue gun
- Hot air gun
- Bondo 500g-1kg
- Sandpaper, various, 36g-200g dry 800-1200 Wet'n'Dry
- Masking tape
- Spray putty
- Primer
- Black spray paint
- A section (flange) of 120mm storm (plastic) water pipe
- A couple of small scrap pieces of Plexiglas

Case modding has come a long way since the days of placing a window and light into the side of the old beige home computer box. Modders of today strive for new ways and ideas to show off their skills and present the works of art that grace our online communities and pages of *Atomic*.

Bondo, bog, nikki, panel filler, putty... whatever you call it, this easy to apply, fast drying stuff has become one of the most popular materials used in case modding today.

The product was originally created for the repairing of car auto panels. It's a two-part polyester that when mixed turns into a putty which then sets and becomes rock-hard, usually within minutes. This can then be applied to a dented panel and then sanded to become the original shape of the panel.

What follows is a guide on how to create your very own mega bondo blowhole, but the process can be applied to any inner or outer plastic or metal panel to add your own unique touch to a modded case.

This mod is a weekend job – you can knock the whole thing over in about four to six hours, but with bondo re-applications and dry times, take your time over two days, it's worth the effort!

1

A good old Pentium 2-era HP case front – the perfect victim for a dual blowhole mod. Grab a section of 120mm PVC pipe, a pencil and a ruler, find your centre and mark a line. There are plenty of ways of doing this – we're sure you will work it out. If in doubt, look at the back of your panel for 'casting lines' or marks. These can be helpful in finding a centre point. All storm water or larger PVC is joined by two perfect halves.

This makes our life easy, all you have to do is mark the joins and then line the marked joins up with the centre line on the job.

Mark out your circle or in this case two circles, then using a straight edge for a dual hole cut, join the edges of the marked circles. This is a temporary marking – do it this way to



be 100 percent sure before you commit to masking and cutting.

Why do we need to mask up? Simply because plastic melts with heat, the jigsaw heats the plastic as it cuts off the back of the blade, if this plastic is allowed to fall back down into the freshly cut joint, it tends to melt and fuse back into place. At the end of your cut you end up with a re-welded cut and no hole. If you have decent lighting you will have no problems seeing your old marks through the masking tape.

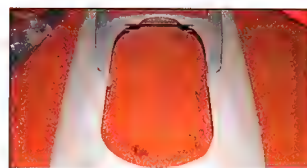
2

If you're using a jigsaw, use the fast-cut wood blade. It will cut faster and smoother on plastics than the fine-blade as shown here, which will tend melt the plastic or Plexiglas as it cuts.



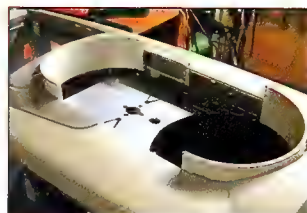
3

The main hole is now cut. We need to roughen up all the surrounding edges on both sides of the panel. This will help your bondo to adhere to the job better. For plastics P40-grit yellow paper is enough.



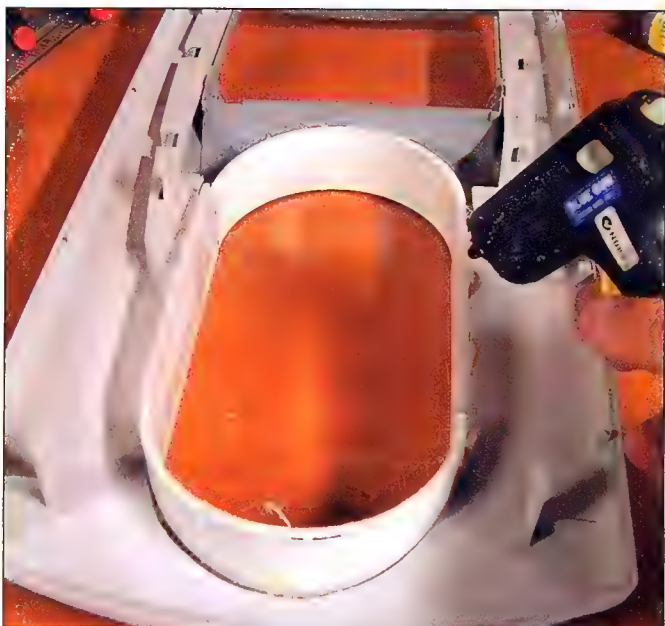
4

With the hole now cut and prepped the 120mm PVC pipe is cut in half to create the top and bottom bends of the mega blowhole. Scraps are cut and used to make up the gaps between the upper and lower bends.



5

A few spots of hot glue to the back of the parts to hold them in place and the mega blowhole is taking shape. A dummy to filler panel is also cut and spot-glued into place before the bondo process.



- 6** Almost half way through this guide and finally up to the fun part. Bondo time!

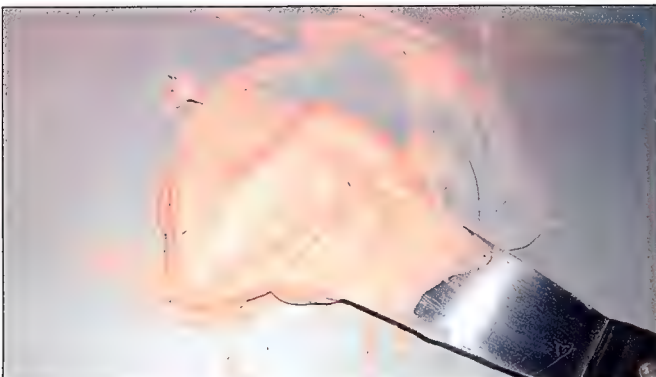
Bondo is just a way to shape surfaces, fill gaps and holes. We can't really recommend one type or brand over another. Some people say there is proper plastic putty for plastics, some say lightweight is better. If your surfaces are prepared properly as shown and the bondo is mixed according to maker's specs and you apply it with firm even pressure, it will work. How much do you mix at a time? Don't go overboard.

It's better to apply more on the next go, rather than scrape a wasted amount that's gone hard on your mix board into the bin. Take a good look at what you need to do. In this case we just want to start by filling in the area behind the dummy panel. Later we will mix more for the back of the blowhole and the front.

What mixture ratio? That's on the can. However the more hardener you add the faster your mix will go off (harden). Different brands will react with different dry times. Best to have a bit of a play and see what suits your speed.



- 7** Mix the bondo with overlapping turns. Scoop your mixer under then flip over and back down into the mix with even, very firm pressure, working up and back over and down back through the mix, until you have an even-coloured mix. No swirls of colour through the mix – you need it to be nice and even.



- 8** Don't dilly dally here! Get that mix onto the job and scoop enough to be able to apply it in one go to that spot.

Don't rework the same area, you will pull the mix out of the spot it was intended to go to in the first place. Again if you haven't mixed enough, no problem – mix some more. It's still better than wastage. Flip the panel over to work on the front, work the bondo into the corner and up the side of the raised edge, and then repeat using firm pressure to ensure the bondo is worked right into the corner.



- 9** Looks bloody ugly we must say. But with some sanding (which is coming next) we will become master sculptors.



- 10** Now that the bondo is nice and dry, it's time to start doing some sanding.

This is the first step in what will be a two-part bondo sanding to the final hard putty. Tools to use here can be a small electric hand sander, but for the sake of those who don't have access to power tools we'll use a hand sanding block. Choice of sandpaper is two sheets of P36-grit yellow paper. One sheet on the block and a thinner strip that can be torn up into smaller pieces for the smaller hand work.

Hand blocks can be bought from local hardware shops as can your paper – the blocks are about \$5.

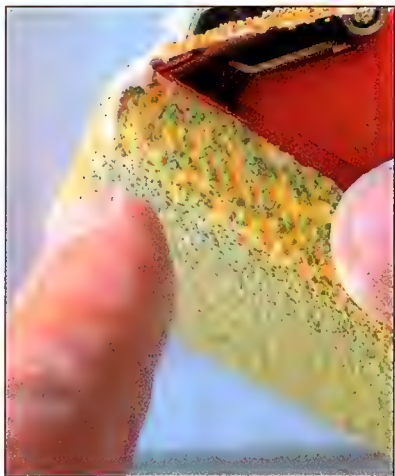
Firstly, sand the top until it is smooth. The method here is to work up ➤



one edge at a time, working along the whole side in long even strokes. Try not to dig in one area if there are larger pit holes. No need to dig the end of the paper into these spots. Keep working in long even sections, the pits can be filled in later. Use the edge of the hand sander – this will give you an even, straight line.



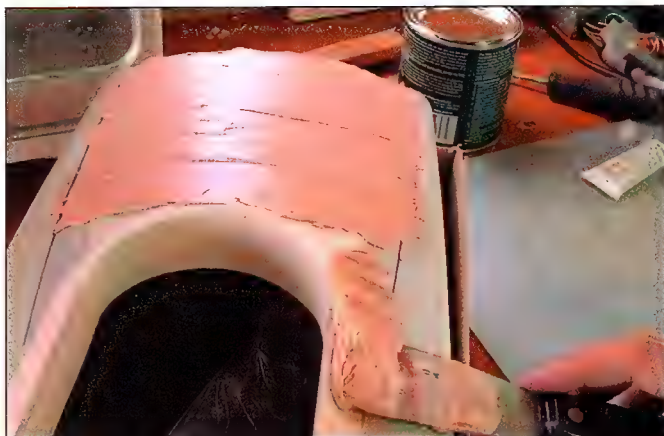
11 Once the bulk of the sanding is done, you can concentrate on smaller areas. Again using your hand block, work on smaller areas one at a time. Using the edge of the block you can shape areas as needed. Using some of the strip 36g paper it's time to do the gritty work. Bending paper this way you can use it and your finger to get concave, round shapes and work in larger grooves.



12 This is now a very rough first sanding step, and as such large pits and holes will be visible. These are cleaned using a wire brush or by blasting with air.



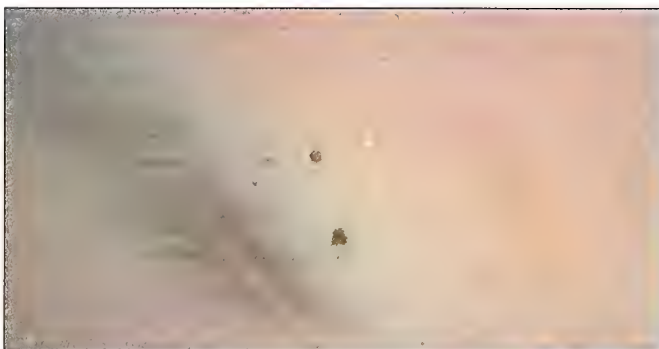
13 A final application of bondo to fill the pits and build the whole area to a point where it is now above your working level.



14 Next its back for more sanding, once again start with 36g to knock the initial roughness off, then switching to some finer 100g paper for the smoother finish.



15 Again you're left with fine pinholes. For these a finer type of putty is needed. Blade or spot putty is available from your local auto parts shop. When applying your fine putty use finger pressure and press the putty firmly into the holes. Allow these smaller fills to dry over night and again sand smooth using 200g dry paper.



16 The panel is now ready for a few coats of high-fill spray can putty. Holding the can 15-20cm from the panel, apply thick, even coats allowing a few minutes between each coat. Usually three to four coats is more than enough to fill any smaller pits and seal down edges. Again, allow to dry at least overnight.

We sometimes will let a panel sit at this point for up to a week to allow for the best results.



17 Once your panel is dry enough you can now make it wet again. The next process is the wet and dry sanding stage.

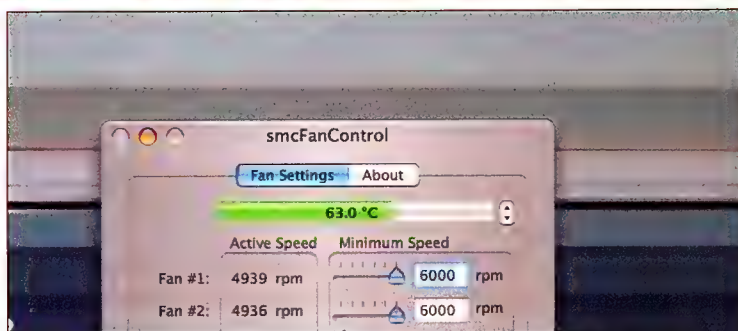
Using 800g wet and dry, and a bucket of clean warm water, sand your freshly prepped panel smooth, again using even strokes.

A quick dust coat of black paint can act as a good guide to getting an even finish to wet sanding. Your end result is a clean, smooth, professional-looking dual blowhole modded panel that's ready for further modding or paint.



18 And here we have it, the end result after some paint and modding. From here on in, you're free to do whatever you want with the case. Except now, it has a massive big blow hole to keep things cool, or to stick stuff in. It's up to you!





DIFFICULTY ATOMIC ●●●●● Run Vista, Linux and other OSes under Mac OS X, Part 2

Jake Carroll continues his epic quest for complete operating system harmony.

Last month, we discovered how virtualisation technology ticked and then created some virtualised environments. This month, we are going to use these environments, showing you some of the features and how to run virtualised services on them.

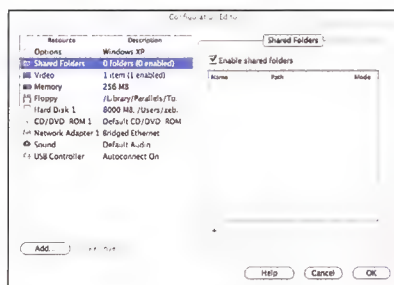
Sharing is good

It's time to share your virtual machine's enclosed filesystem to other places and operating systems. What use is an encapsulated environment if you can't get to it from elsewhere? Start up Parallels and open the options screen. Open the 'sharing' parameter.

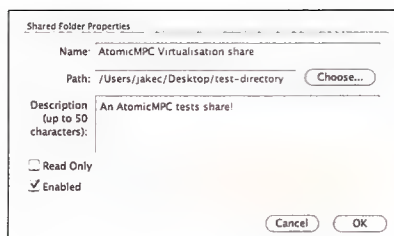
Next up is configuration of the shared directories. Under Mac OS X, this directory can reside anywhere provided it has the same ownership of the user running Parallels. For example, if you are the user 'joeb', then the directory should have primary ownership of 'joeb' and belong to a group (GUID) that 'joeb' is associated with. Figure 1 shows the configuration of a shared directory.

The shared directory is ready to test out. We popped some images in there prior to starting up the virtual machine. Once the Windows XP VM is up and running, we clicked on the 'Parallels Shared Folders' icon on the desktop. The results are shown in Figure 3.

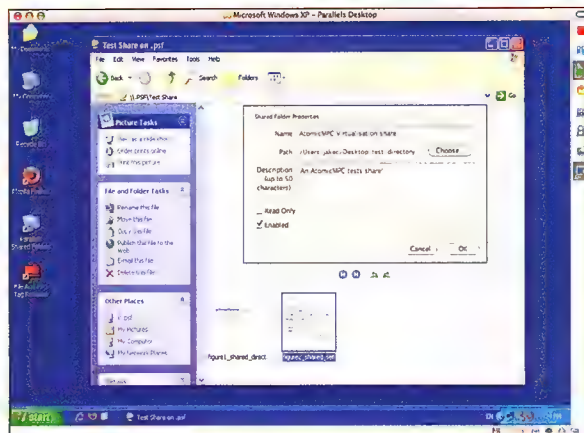
This is all achieved



▲ **Figure 1 – Parallels Shared Folders configuration.**



▲ **Figure 2 – Assigning a pre-created test directory.**



▲ **Figure 3 – Shared files in the virtual machine.**

through a hidden SMB/CIFS share between Mac OS X and Windows XP. If you look closely in the process list, you'll see a parallels PID. The next handy sharing feature is Desktop Coherence mode. It was introduced in the very newest 3036 beta build of Parallels Workstation for OS X. Desktop Coherence mode allows the Windows Start menu (or Vista Logo menu) to run in line with the Mac OS X Doc. To enable it, Parallels Tools

must be installed, as shown in Figure 4.

Now that Parallels Tools is installed, we can use the Coherence mode switch on the right hand side of the OS window, as shown in Figure 5.

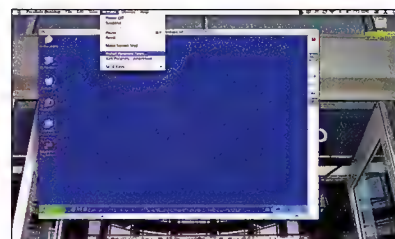
With the mode switched, Figure 6 shows the WinXP VM working side by side with Mac OS X apps and Windows XP tools.

Perhaps the most powerful new OS sharing function in Parallels is the ability to use it to boot/virtualise from a Mac OS X Boot Camp partition. This saves the hassle of installing a new VM.

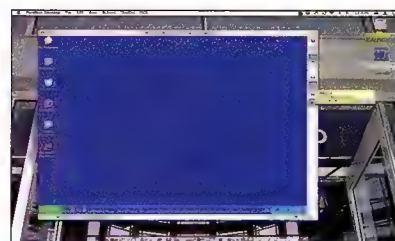
Ordered list

- 1 Boot into Windows XP via Boot Camp.
- 2 Download and install 'Parallels Tools for Boot Camp.exe' from the Parallels website: download.parallels.com/beta/Parallels-Tools-Bcp-1.0.3-Win.exe.

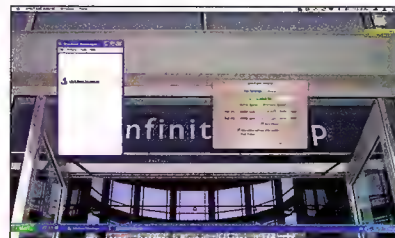
- 3 Reboot the machine, once installed.
- 4 Boot into Mac OS X.
- 5 Open Parallels Desktop and select 'New'. At this point, the OS Install



▲ **Figure 4 – Installing Parallels Tools.**



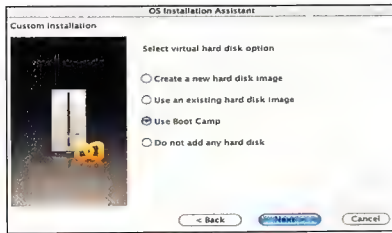
▲ **Figure 5 – Coherence Mode switcher.**



▲ **Figure 6 – OS X and Windows XP applications in Coherence Mode.**

Assistant should start. When it does, select Custom mode for installation.

- 6** When prompted for the type of virtual hard disk option – select 'Use Boot Camp' as shown in Figure 7. It's just a simple process of booting up and selecting the Parallels profile. The next release of Parallels promises true Direct3D acceleration on the virtualised desktop. The idea of gaming inside the VM just became more realistic!



▲ **Figure 7 – Install from Boot Camp option.**

Zone services

It's time to run up some services on our software partitioned zones created last month in Solaris 10. We created two zones – a fileserver zone and a Web-server zone.

Power on your Solaris 10 global zone/domain. As we've set the autoboot to true in our last configuration session, both zones will be 'powered on' when the global zone is. The zoneadm list -cv command will show what zones are active:

```
bash-3.00# zoneadm list -cv
ID NAME          STATUS          PATH
0 global          running         /
2 fileserver-zone running         /export/home/
  fileserver-zone
4 webserver-zone  running         /export/home/
  webserver-zone
```

Fileserver zone setup is first, so that it can share files out to your mixed operating environment. This is achieved via installing samba. We recommend using the blastwave.org packages, as the Sun Microsystems packages don't support Kerberos or A/D easily. Follow this guide, for pkg-get installation: www.blastwave.org/howto.html

Once you have pkg-get installed:

```
bash-3.00# pkg-get -i samba
```

This will install samba for you, into the /opt/csw/ directories. This /opt/ is inherited into your zones, so you never need to repeat this process again, for subsequent zones created.

Log in to the fileserver-zone as root:

```
bash-3.00# zlogin fileserver-zone
```

From here, we need to set up an smb.conf to appropriately allow access to a shared directory structure. Our configuration file is placed in the following location:

```
/opt/csw/etc/samba/smb.conf
```

A sample configuration file:

```
[global]
  workgroup = WORKGROUP
  server string = AtomicMPC test file-server
  security = share
  hosts allow = localhost, 192.168.0.1,
  192.168.0.66, 192.168.0.11, 192.168.0.61
  load printers = no
  log file = /opt/csw/var/log.%m
  max log size = 50

[homes]
  comment = Home Directories
  browseable = no
  writable = yes

[atomicshare]
  comment = Samba test for AtomicMPC
```

Virtualisation Demo

```
path = /export/file_dump
public = yes
writable = yes
printable = no
read only = no
```

The above configuration file allows Windows clients to map directly to the IP address of your zone and then find a share called 'atomicshare' which is world read/writeable. This might be handy in a media-hungry lounge-box/media centre repository when you need to dump to it quickly from multiple locations on a private home network. Some ACL's have been set up via IP address, as is dictated by the host's allow directive.

From now on, the zone will self-start the smbd. This can be verified by checking the process tree:

```
bash-3.00# ps -ef | grep -i smb
root      691      1    0 10:06:22 ?           0:12
/opt/csw/sbin/smbd -D
root      814     691    0 10:06:24 ?           0:00
/opt/csw/sbin/smbd -D
root     7791    2334    1 22:34:54 pts/2      0:00
grep -i smb
```

We have an enterprise-grade file serving daemon now.

Let's get a virtualised Web server up and running in our Web-server zone! Log in to your Web-server zone and install Apache2 using pkg-get:

```
bash-3.00# /opt/csw/bin/pkg-get -i apache2
```

The zones do not inherit connection details from the global. You are probably missing a /etc/resolv.conf in your zone if you get a message like this:

```
WARNING: no catalog file for site ibiblio.org
Updating catalog file first
Getting catalog...
--04:02:30-- http://ibiblio.org/pub/packages/
solaris/csw/unstable/i386/5.10/catalog
=> `catalog'
Resolving ibiblio.org... failed: node name or
service name not known.
```

If this is the case, place a nameserver entry in such as:

```
nameserver 192.168.0.254
```

Or whatever your router config/ISP DNS is set to. Once you've done all this, test for HTTPD presence:

```
bash-3.00# /opt/csw/apache2/sbin/apachectl start
```

You should be given a message suggesting Apache is already running, with the PID quoted. Once you are confident your httpd is up and running, you should send the virtualised environment an HTTP request from a browser. In our case, the Web-server zone's IP address was 192.168.0.12, so we did the following:

```
http://192.168.0.12
```

In classic blastwave fashion you should be greeted with 'It works!' in raw HTML. To start changing settings or adding content to your virtualised Web-host, you will need to modify:

```
/opt/csw/apache2/etc/httpd.conf
```

All Web content and HTML or documents for serving should reside in:

```
/opt/csw/apache2/share/htdocs
```

And with that, you are off and virtualising! You are now truly free of OS constraints and have the understanding to run up virtual services inside software partitioned operating systems. You wanted ultimate computing power. Now you have it!

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INPUT OUTPUT

Fixing stuff no one else can, including God and your mum

Input Output

Having some trouble with your PC? Is there a tech quandary that has you all flustered? **Dan Rutter** can probably help you out at io@atomicmpc.com.au.



INPUT OUTPUT

Perhaps there's a hidden hot tub

I According to the specs of Dell's 30" LCD, it has a power consumption of up to 147 watts. That's more than my 21" CRT! There goes my idea of boosting my UPS runtime by switching to an LCD.

I thought LCDs were supposed to be low power? Surely they don't stick a 140W backlight in them?

Adam Nielsen

O Yes, large LCDs can consume a surprising amount of power. But they often don't, and there are some other factors to consider.

First up: The power ratings on the back of appliances are usually higher than what the device actually typically draws. This is so that people don't get taken by surprise by the inrush current as their CRT degausses, or by the hefty draw of their laser printer or refrigerator when it's warming its fuser or running its compressor, respectively. It's good practice to set up your wiring as if you expect everything to draw maximum power all the time, but only things like heaters, toasters and light bulbs actually do.

Secondly: A 30-inch 16:9 LCD has almost exactly twice as much screen area as a '21-inch' 4:3 CRT with a 20-inch viewable diagonal. That's a whole lot of monitor, and it all needs power to switch and light its pixels.

It's not hard to find 20-inch LCDs with maximum power ratings down around 75W. That's about the same rating as a modern '17-inch' CRT – viewable diagonal 16 inches, with about two thirds of the screen area.

Thirdly: Modern LCDs generally have very high maximum brightness. Unless you're using them somewhere brightly lit, you can and should run them at nothing like their maximum brightness, and that'll save some watts, as well as your eyesight. One of the most basic ergonomic mistakes is running your monitor too bright. It shouldn't actually be any brighter than a well-lit book.

Fourthly: LCDs are much better suited to power-saving blanking than CRTs. A CRT in

sleep mode has to warm up when it's turned back on, but an LCD can turn on almost as fast as a light bulb. This makes it much more practical to set a short monitor-sleep timeout, which saves even more power.

Rising smoke also a concern

I What should a Peltier read on an ohmmeter? My little fridge has packed up and it's either the Peltier or it's the switchmode PSU. The PSU is fine under mild load (the fridge fan), and off load. The Peltier on my meter reads zero ohms, both ways. I think not good for a semiconductor device?

Martin Barfield

O I don't know the impedance range for different Peltiers, but there should be some kind of reading in one direction, as the small current the meter delivers passes through the device. You probably do have an open-circuit Peltier on your hands. There's not much you can do about that. In theory it's possible to pry it apart and bypass the dead junction(s), but in practice it's just not going to happen.

Peltiers most often die, I think, because water gets into them. This can obviously happen easily when there's condensation on or around the element. They're sealed around the edges

I/O OTM wins a Logitech G5!

There's a mouse in the house. Okay, it's not in the house, it's in IO. And it looks damn good.



to keep it out, but the sealing on the cheap Peltiers used in coolers probably isn't very good, and the ones people use in PC water cooling rigs often aren't much better.

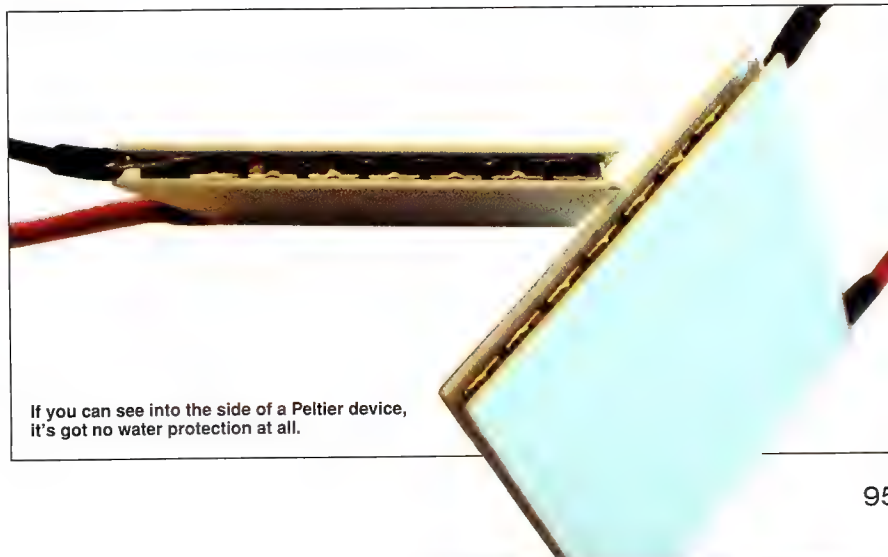
If it falls off, it isn't necessary

I I was recently installing my brand new XFX GeForce 7950GT and, in a move of pure brilliance, managed to break a piece off. It's one of those little cylinder things that sticks out of the card, looks a bit like a battery. It's maybe 5mm across and about the same high. On it, it says '50, 100, 25a'. The card seems to work just fine, but I'm concerned I'll have problems down the road. Any idea what it might be?

Tom Kilbride

O It's a capacitor, probably for power supply smoothing.

Your video card is, therefore, probably now



If you can see into the side of a Peltier device, it's got no water protection at all.

a bit more susceptible to misbehaviour if it gets noisy power from your motherboard. In practice, this is unlikely to ever be a problem.

But don't do it again.

Incidentally, the smoothing caps that you usually find in a forest around CPU sockets are similarly semi-disposable. It's not *good* if you break one or two of them off, but as long as you don't manage to create a short circuit out of what's left, the computer will usually keep on running just fine.

This is just as well, by the way, because these large capacitors are all the 'electrolytic' type (a.k.a. 'electros'). They're the only capacitor type that gives you large capacitance values for a low price, but they're famous for drying out over time and changing value. If you make something that depends on an electrolytic capacitor holding its value for its operation, then that device will be certain to drop dead after a few years. But as things stand, old computers just get touchier about their power supply.

(And old power supplies become dodgier, too – they have quite large electros in them.)

The Mystery Cable

I am planning to hook my game console up to a computer monitor and a simple set of speakers with standard input. I wanted to use the console's component video, and I was able to find a component-to-VGA adaptor

for the monitor.

The left and right audio have been a little trickier. Nobody seems to have what I need in that area – two RCA sockets on one end, one computer-style 1/8-inch stereo socket on the other.

I was wondering if you could point me towards a retailer that carries something along these lines. I have tried 'the Google' to no avail.

I also have found similar cords with both male and female connectors that I could use with a few other adaptors, but I don't want to have to buy multiple parts and daisy chain them if it is not necessary to do so.

Adam Klafter

The opposite gender adaptor to the one you want – two RCA plugs to a stereo 1/8-inch plug – is a standard cable that people use to hook a PC up to a regular hi-fi system. You can get them from any electronics store.

Worst case scenario, as you say, you could get one of those, one 1/8-inch stereo female-to-female adaptor and two RCA female-to-female adaptors, and you'd be set. Those latter adaptors (or 'couplers') are small solid objects, not cables. They're standard electronics-store items, too.

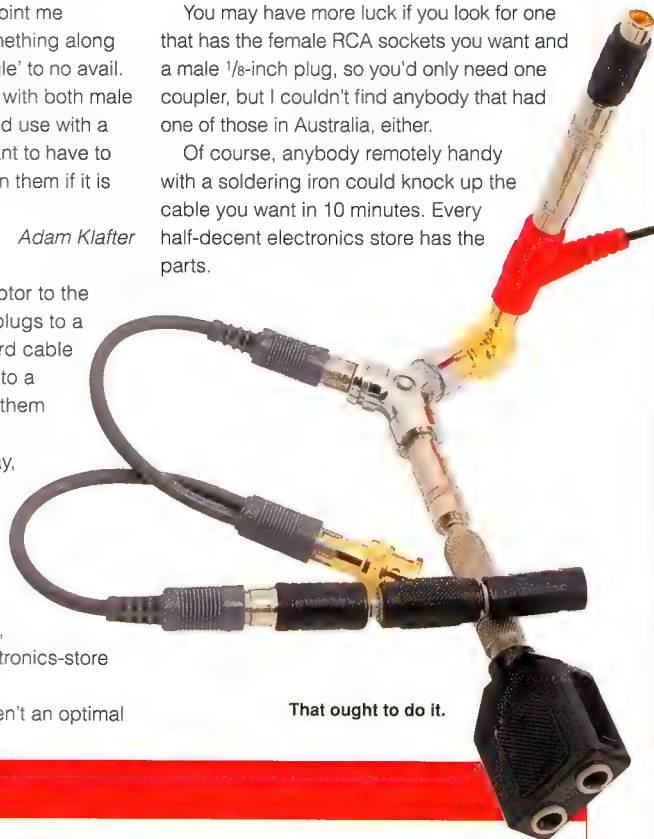
The extra couplers certainly aren't an optimal

solution, but they'll get the job done well enough for audio.

I've never seen the female-to-female version of the cable as a separate item. I think I saw one as part of the bundle for a speaker set, or something, once.

You may have more luck if you look for one that has the female RCA sockets you want and a male 1/8-inch plug, so you'd only need one coupler, but I couldn't find anybody that had one of those in Australia, either.

Of course, anybody remotely handy with a soldering iron could knock up the cable you want in 10 minutes. Every half-decent electronics store has the parts.



That ought to do it.

I/O OF THE MONTH

Antenna antics

I live in a rather large house in which the wireless network signal has to pass through a fair few walls that create some small dead spots in the house.

I have been browsing around and noticed that there were three solutions available that may or may not solve my problem.

First was the wireless range extender offered by D-Link, which I believe simply acts as a repeater. The second solution was replacing the antenna on the wireless router with a 5dB or 7dB version offered by D-Link. Finally, I came across the Netcomm indoor wireless booster (200 or 500mW versions) that attaches between the router and the antenna.

Are any better solutions available?

Tony Hatzifotis

Provided you already have your wireless access point sitting somewhere high up and near the middle of the house, a bigger antenna will probably do the job.

The standard antennas on access points generally only have around 3dB of gain, which combined with the *miserable* gain of the antennas built into many laptops and

Wi-Fi cards can, indeed, be bad news.

But you can get 9dB omnidirectional SMA-connector antennas (technically it's a reverse polarity, or 'RP', SMA connector) on eBay these days for US\$16 delivered (do an eBay search for '9db booster antenna').

Each 3dB is a doubling of power, so upgrading to a 9dB antenna should give you about four times the signal level at any given point. The big no-name antennas are also far cheaper than brand-name smaller ones.

If you have an access point/router with a standard SMA connector for its antenna(s), the upgrade is dead simple. Remove old antenna, plug in new one. The access point probably won't even care if you do this while it's on, but it's polite to turn it off first.

(If your access point doesn't have external SMA antenna sockets, by the way, then it may have an MC Card or some other mini connector, and that connector may be inconveniently located inside the casing.)

Make sure that you buy an omnidirectional antenna, not a directional one. Directional antennas *can* be used on access points – if you have one with two antennas then you can replace one antenna with a directional unit pointing in whatever direction's most important to

you – but you probably want an omni.

Note that it's also not very difficult to make your own 6dB or better antenna. All you need is a suitable plug (Jaycar has a right-angle SMA, #PP0631, for \$4.95), a few other cheap components, and the ability to solder. See tinyurl.com/7c4xq for instance.

Look at that cute little thing. Let's rip it off.





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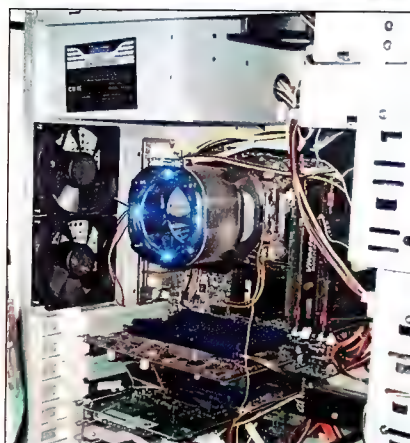
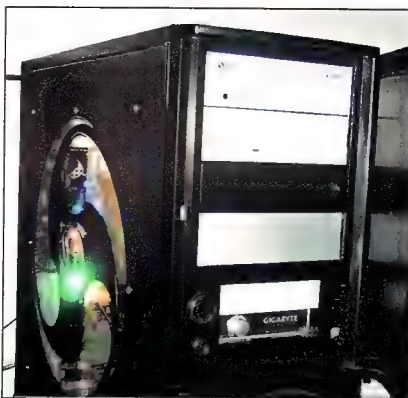
DaBludger's Rig ▼



technical details

- Intel Pentium 2.8GHz @ 3.8GHz
- ABIT IC7-MAX3 motherboard
- 2x 512MB Kingmax DDR500 RAM
- MSI NVIDIA FX5950 Ultra
- 2x 36GB Raptors in RAID 0
- 200GB Seagate HDD

Moe's Beast ▼



technical details

- Intel Pentium 4 3GHz with a custom cooler
- ASUS P5AD2 Premium wireless edition
- 4x 512MB DDR2 Vitesta Performance RAM
- ASUS ATI EAX600XT/HTD videocard with a custom cooler
- 400W power supply

TheJalb_k's Womp Ratter ▼



technical details

- Intel mPGA378 P4 3.2GHz
- Intel D865PERL
- 4x 512MB RAM
- RADEON 9800 PRO
- 120GB & 250GB WD SE SATA
- 600W PSU

hotbox

OF THE MONTH

HOTBOX



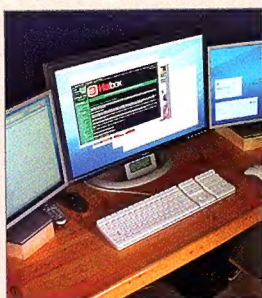
Glen's SLI Box

After many years of 'modding' cases in the glowing, UV reactive, painting sense of the word, I finally decided to make something more original, practical and neat. Too many people these days consider putting fans that come with LEDs in them, in places where fans are meant to go 'modding'; so I decided to get back to the basics. I changed my case for a performance benefit, by increasing airflow, while adding some neater visual elements as well. One example is the laser-etched custom side panel which features a piano hinge for easy access to the innards of the case.

Glen

technical details

- AMD 3500+
- A8N-SLI
- 2x BFG 6600GTs
- 2GB DDR RAM
- 200GB WD HDD
- Dell 2405FPW



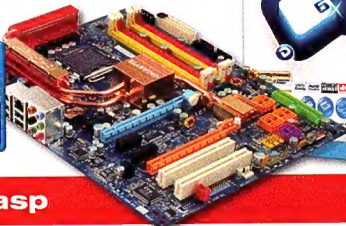
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FALLOUT

Funnies and humour from the fallout zone



Captain Swung Dash sails the board's keys

The trouble with tildes

How can one glyph mean so much to so many?
Logan Booker waxes.

Tilde is an interesting word. Not as interesting as the character it represents, which is '~', but interesting nonetheless. Kind of like your second cousin who's hotter than a fusion of Angelina Jolie and Jessica Alba, who, if you tried anything on, even gently brushing her blouse bunnies with your pale white elbow, would have you sent to hell faster than Hitler in a Panzer-shaped basket.

Suddenly, tilde sounds like the dirtiest word ever conceived.

Ah, conceiving!

Super sexy but seriously sinful siblings aside, gamers will be more than familiar with uncomfortable but utterly wrong primal urges associated with the tilde key (that from now on, will be referred to as the ~ key... which technically is the same thing if you say it out loud).

Yes, I'm talking about cheating, whacking that tilde key like there's no tomorrow, stroking off a few unscrupulous codes you flogged from

GameFAQs and watching in glee as wall hacks and aim bots explode on-screen.

I should probably mention at this point, for no reason at all, I used to call the key 'tidle', much to the amusement of my peers and my brother who, when I was young, would point to the keyboard and go, 'Logan, what's that key called?' to which I would reply 'I hate you and everything you represent.' Eventually I would acquiesce and say 'tidle', and he would giggle like a 12-year-old, because, well, he was 12.

Dreams about bashing his head in with a nerf bat came to me often, but proved frustrating and of little relief, as my dreams revealed that it is impossible to bash much of anything with a nerf bat, except for a marshmallow or perhaps an extremely small kitten.

Getting off nerf bats, but not getting off on them, unlike that second cousin, the ~ is also apparently known as the 'swung dash'. Sounds

Gamers will be more than familiar with uncomfortable primal urges associated with the ~.

more like an oriental swashbuckling superhero. Not a Guybrush Threepwood type, but more Worf the Klingon if indeed Worf had lived in the 16th century and swashed buckles with the best of them. I can't imagine that swashing or swishing or sashaying buckles could have been that exciting, unless you had nothing else to do but eat the contents of the underside of your toenails.

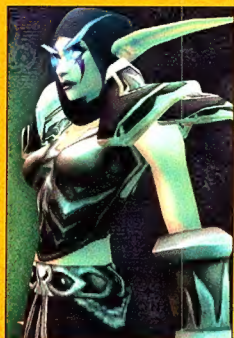
Let's imagine, just for a second, that our ~ is indeed Swung Dash, the mighty Japanese/Klingon pirate of the world of graphemes. He'd have his boat – a pair of equal signs, see '==' – and perhaps a mast – a pipe, which looks like this '|' – and even a sail... a right parenthesis like this ')'. That way, Swung could venture forth and raid, pillage and loot sentences everywhere for more equal signs, parentheses and pipes, and build himself a fleet of grapheme ships, if that's what he felt like doing. He could just knit, if he didn't have pillaging in his heart.

All I'm saying is give a thought to the tilde. It does so much for so many people, and it deserves your respect. So, next time you bring down that console, or build an ASCII boat, or attempt a union so completely blasphemous Satan himself would dry retch in shock, give a thought to the tilde. And Swung Dash.

Because no one else will.



NEXT MONTH



10GHZ CPU

Intel said we'd be there by now, but quickly backtracked a few years ago and now we just have dual and quad core. We go on a journey through the technology showcase that makes CPUs happen and find out what's stopping us from hitting 10GHz.

WORLD OF WARCRAFT UI MODDING GUIDE

Want to be the best in your raid? Have the ultimate interface for PvP? Then you can't miss Atomic's WoW mod guide. We'll show you the perfect mods to streamline your gaming experience, and even show you how to make your own, as well as tweak those that you have!

CORE 2 MOTHERBOARD ROUNDUP

Planning on upgrading to the awesomeness that's Core 2 but not sure which motherboard will suit? We have everything from Gigabyte to ASUS to EVGA! Also 680i and 590 for Intel. Whatever the chipset or budget, we have a board or four.

COMMAND & CONQUER 3

Cain is back and he wants some action. Nuking action that is, with a bit of tiberium on the side. We had a chance to chat to the great dev team at EA about the next instalment in this excellent series. All the good stuff on this upcoming sci-fi RTS in the next issue!



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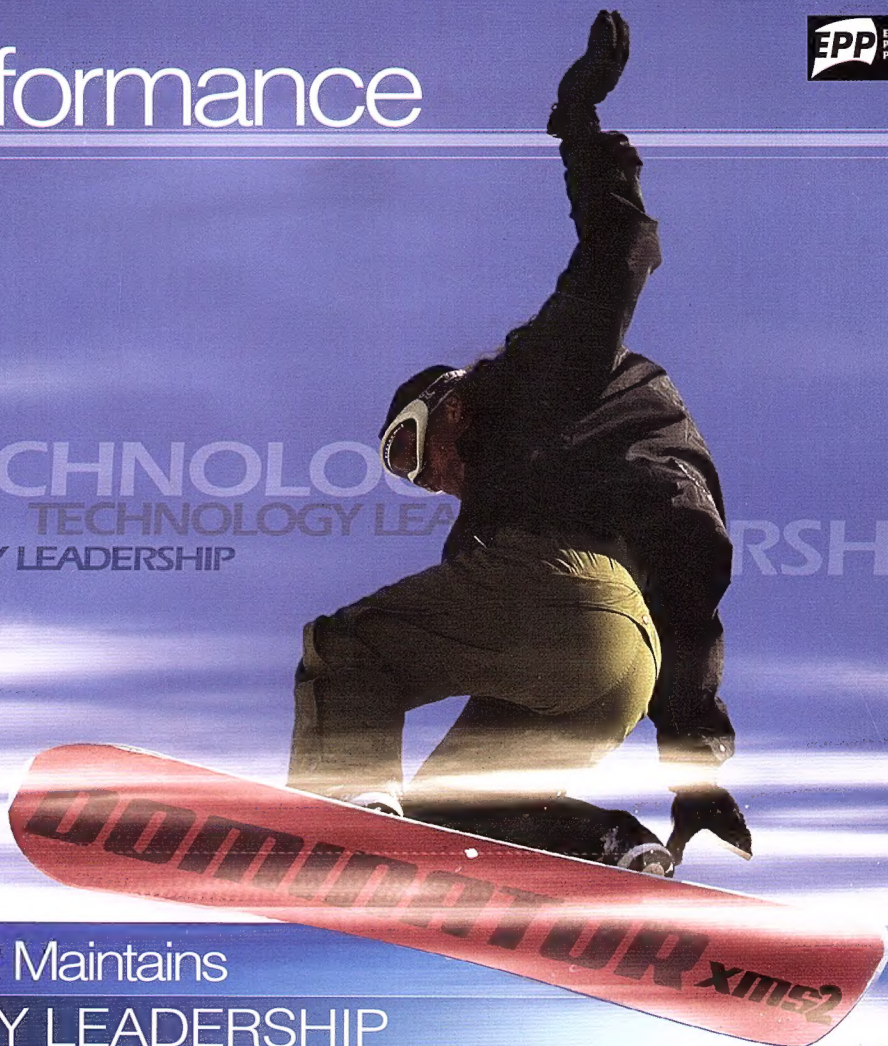
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cool performance



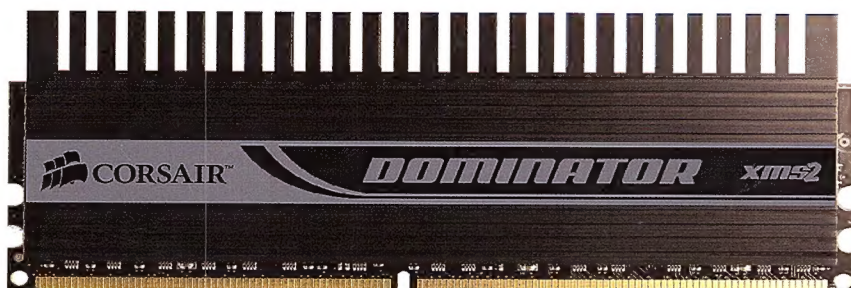
TECHNOLOGY LEADERSHIP

TECHNOLOGY LEADERSHIP



How CORSAIR Maintains TECHNOLOGY LEADERSHIP

DOMINATOR xms2



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Pushing performance specs generates heat, and that can compromise reliability and component life. The advanced cooling ability of DHX heat sinks keeps your memory safe and reliable even as you push it to the limit. Under the name XMS2 Dominator, this DHX technology will be showing up on both Corsair parts designed for extreme overclocking and on memory designed for performance computing and gaming.

Also Featuring Enhanced Performance Profiles (EPP)

As with all new Corsair performance memory, XMS2 Dominator modules feature EPP, the new open standard for the Serial Presence Detect (SPD) jointly developed by NVIDIA and Corsair. EPP simplifies overclocking for beginners and provides unparalleled control for experts.



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An optional fan (not shown) provides even more cooling and protection.



Corsair's proprietary DHX technology dissipates heat two ways: it draws heat away from the module through the RAMs and provides an additional path for heat transfer within the module through the ground plane!